

Assessment of IgG and IgA level in Smokers – A Cross-sectional Study

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ABSTRACT

Introduction: Immunoglobulins are raised in smokers and gutka chewers. IgA and IgG show significant increase in count. The present study was aimed at estimation of immunoglobulins in smokers in study population.

Objective: The objective was to assess the estimation of immunoglobulins in smokers in study population.

Materials and Method: The cross-sectional study was conducted on 120 subjects of both genders. Subjects were divided into 2 groups. Group I comprised of 60 smokers of both genders and group II comprised of sex matched control. Serum level of IgG and IgA was estimated by automated Nephelometry method.

Result: The mean level of IgG was 14.24 in group I and 7.45 in group II. The difference was significant ($P < 0.05$). The mean level of IgA was 3.12 in group I and 1.21 in group II. The difference was significant ($P < 0.05$).

Conclusion: The raised levels of IgG and IgA in smokers as compared to control group increase the possibility of detecting the lesions at early stages. Thus, the subjects with habit of smoking should be routinely assessed for IgG and IgA level.

Keywords: Immunoglobulins; leukoplakia; smokers.

INTRODUCTION

The harmful effect of smoking on human body is well established. The tobacco may be used in smokeless form or smoking form. Smokeless form comprised of zarda, chaini, gutkha, etc. Smoking form comprised of cigarette, bidi, hookah, hookli, etc.¹

Pre-cancerous lesions and conditions are generalised state of body associated with significantly increased risk of cancer.² Leukoplakia, erythroplakia and

palatal changes associated with reverse smoking are examples of pre-cancerous lesions.³

Leukoplakia is quite common and defined as white patch or plaque which cannot be defined as any other disease which is not associated with physical or chemical agent except the use of tobacco.⁴ Oral leukoplakia is a precancerous or potentially malignant lesion, which means that in this morphologically altered tissue, cancer is more likely to occur than its apparently normal counterpart. In general, it is more or less accepted as

an overall statement that approximately five percent of all leukoplakias will transform into cancer in an average period of five years.¹

Immunoglobulins are synthesised by plasma cells and to some extent by lymphocytes. Five classes of immunoglobulins have been recognised – IgG, IgA, IgM, IgD, and IgE (WHO 1964) from them IgG, IgA and IgM are major and IgD and IgE are minor immunoglobulins. Immunoglobulins are raised in smokers and gutka chewers. Among five classes, IgA and IgG show significant increase in count.⁵ The present study aimed at estimation of immunoglobulins in smokers in study population.

MATERIALS AND METHOD

The present study was conducted in the department of Oral Pathology and Microbiology of M.B. Kedia Dental College Pvt. Ltd., Birgunj. This was a hospital based cross-sectional study which included all the patients meeting to our inclusion criteria between 2018 November to 2019 January. It comprised of 120 subjects of both genders. Subjects with history of smoking and leukoplakia confirmed with biopsy were included.

Patients with history of diabetes mellitus, any respiratory infection, liver disorders, hypertension, endocrine disorders, myocardial infarction, stroke, thyroid disorders, allergic conditions and autoimmune diseases which could affect immunoglobulin level were excluded.

The proforma included demographic profile of the subjects and presence or absence of history of smoking. Subjects were divided into two groups. Group I comprised of 60 smokers of both genders and group II comprised of sex matched control.

For serum immunoglobulins estimation about 2.5 ml blood was collected from antecubital vein in all

subjects. After centrifugation serum was separated and collected in separate container after that the serum levels of IgG and IgA were estimated by automated Nephelometry method.

In subjects with lesion, incisional biopsy was performed under 2% lignocaine and excised tissues were used for histopathologic examination. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

The subjects were informed in detail regarding the study and written consent was obtained in vernacular language. Ethical clearance from the institutional ethical committee was obtained prior to the study.

RESULT

In present study, the level of IgG and IgA in smokers and controls were assessed. The subjects were classified in 2 groups. In a total 120 subjects were included in the study (Table 1). For statistical analysis, Unpaired Student t-test was used to analyze the data. The mean level of IgG was 14.24 in group I and 7.45 in group II. The difference was statistically significant ($P < 0.05$, Table 2). The mean level of IgA was 3.12 in group I and 1.21 in group II. The difference was statistically significant ($P < 0.05$, Table 3).

Table 1, shows that group I (smokers) comprised of 40 males and 20 females and group II (control) comprised of 40 males and 20 females.

Table 2, shows that the mean level of IgG was 14.24 in group I and 7.45 in group II. The difference was statistically significant ($P < 0.05$).

Table 3, Shows that the mean level of IgA was 3.12 in group I and 1.21 in group II. The difference was statistically significant ($P < 0.05$).

Table 1: Distribution of subjects.

Group I			Group II			Total (Group I and II)
Male	Female	Total Group I	Male	Female	Total Group II	
40	20	60	40	20	60	120

Table 2: Estimation of IgG level in groups.

Group I (Smokers)		Group II (Control)		P value
Mean	SD	Mean	SD	
14.24	2.1	7.45	1.3	0.01

Table 3: Estimation of IgA level in groups.

Group I (Smokers)		Group II (Control)		P value
Mean	SD	Mean	SD	
3.12	0.5	1.21	0.2	0.01

DISCUSSION

The habit of tobacco smoking is largely associated with appearance of white lesions in oral cavity. Apart from leukoplakia it also leads to appearance of Oral submucous fibrosis (OSMF) in association of areca nut usage. The immunoglobulins are greatly affected in patients with history of smoking or with leukoplakia. It affects a wide range of immunological functions in human and experimental animals including both humoral and cell mediated immune responses.⁶

Study of immunoglobulins, C3, C4 and IL-8 concentrations in serum of smokers and non-smokers suggested that nicotine activates dendritic cell and augments their capacity to stimulate T cell proliferation and cytokine secretion.⁷ It has been shown in study that there is considerable immunosuppression in smokers due to chronic exposure to nicotine by impairing antigen mediated signaling in T-cells. Smokers exhibit higher IgA and IgG level than non-smokers. It has been shown that in smokers there is irritation of respiratory and gastrointestinal mucosa by smoke. Since IgA is associated with seromucous membranes, it protects these membranes against soluble antigens by inhibiting their adherence to surface of mucosal cells. Hence the presence of tobacco smoke on these membranes results in enhanced production of this immunoglobulin.⁸

In present study we found that there was significantly increased level of IgG. The mean level of IgG was 14.24 in group I and 7.45 in group II. The results are in agreement with Chaturvedi et al.,⁹ which showed Serum IgG and IgA levels were increased in all the grades of OSMF and when compared to the control group, the increase was highly significant ($P < 0.001$).

The higher mean IgG level in smokers as compared to controls also reflects a degree of secondary infection since IgG is the principal antibody in secondary antibody response. It may be suggested that continuous exposure to components of cigarette has stimulatory effects on immunoglobulin production, thus leading to increase in immunoglobulins. The raised levels of IgG in smokers might be one of the mechanisms

to neutralise components of cigarette tobacco via complement activation.¹⁰

We found that the mean level of IgA was 14.24 in group I and 7.45 in group II. There was considerable significant difference in Ig A level in smokers and controls. Our results was in agreement with the results of Prajapati et al.¹¹ They assessed IgG and IgA levels in smokers, OSMF and control subjects. It was found that IgG was higher in smokers and gutkha chewers as compared to control group and were higher in gutkha chewers as compared to smokers. IgG and IgA levels were increased in patients with homogenous leukoplakia and OSMF patients as compared to control group. IgG and IgA levels were also significantly higher in patients with OSMF as compared to that of homogenous leukoplakia. IgG and IgA levels were higher in all the grades of OSMF as compared to the controls and both IgG and IgA levels were directly correlated with the grades of OSMF.

The limitation of the study was small sample size. We involved only leukoplakia cases whereas tobacco pouch keratosis and oral submucous fibrosis (OSMF) patients could reveal different and interesting results. Large scale studies are required to substantiate the results obtained in our study.

CONCLUSION

The raised level of IgG and IgA level in smokers as compared to control increase the possibility of detecting the lesions at early stages. Thus the subjects with habit of smoking should be routinely assessed for IgG and Ig A level.

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Conflict of Interest: None

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