Effect of smoking on total WBC count and platelet count

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ABSTRACT

BACKGROUND: Smoking is one of the most preventable causes of death in our society. Smoking has both acute and chronic effect on hematological parameters. Therefore, in the present study we intended to determine the effect of smoking on Total WBC count, Differential leukocyte count (DLC) and Platelet count. Materials and Methods: A cross-sectional study was conducted on 100 healthy male subjects age between 20 to 50 year, out of 50 were nonsmoker and 50 were smokers. The subjects who suffered any diseases were excluded. Total WBC count, Differential leukocyte count and platelet count were compared between two groups. Results: Study shows that Total WBC count, Neutrophil, Eosinophil, Monocyte and Platelet count were insignificantly higher in smokers than nonsmoker, but lymphocyte count was insignificantly decreased in smokers. Conclusion: Our study showed that smoking had adverse effect on blood parameter and that is injurious to health.

Key Words: Differential leukocyte count, Smoking, Total WBC count

INTRODUCTION

Smoking is one of the most preventable causes of death in our society. The chemicals in cigarettes and tobacco make the smoke which is emitted from smoking them, harmful. Cigarette smoking is the most common type of tobacco use. In average, to date 47.5% of men and 10.3% of women are current smokers. Tobacco continues to be the second major cause of death in the world¹. WHO in 2004 projected 58.8 million deaths to occur globally, from which 5.4 million are tobacco-attributed and 4.9 million as of 2007. As of 2002, 70% of the deaths are in developing countries².³. Scientists have identified about 4,000 different substances in tobacco all of which have certain degree of toxic effects. At least 43 of them are known carcinogens.

Smoking has both acute and chronic effect on haematological parameters⁴. A cigarette smoker is exposed to a number of harmful substances including nicotine, free radicals, carbon monoxide and other gaseous products. All these substances potentially affect atherogenesis and thrombosis⁵. Nicotine is now speculated to be responsible for development of dependence and suppresses immunity while carbon monoxide and other combustion substances are responsible for smoking related cardiovascular disorders⁶. Cigarette smoking alter blood parameters and as well that leads to death. Thus present study was undertaken to find out effect of cigarette smoking on Total WBC count, Diffential leucocyte count (DLC) and Platelet count to apply this information for better investigation and management.

MATERIALS AND METHODS

After clearance from the institutional human ethics committee, 100 healthy male ages between 20 to 50 year with informed written consent were selected for study. Both smokers and controls (non-smokers) were hospital employees and people from surrounding areas of GMERS medical college, Gotri, Baroda. Male normotensives, non diabetic’s smokers with frequency of 5 or more cigarette per day with
more than 1 year duration of smoking will be selected for study. Those having diabetes, Hypertension bleeding disorder will be excluded from study.

Method: Informed written consent was taken from each subject. Five milliliters of venous blood will be withdrawn with minimum stasis into a clean disposable syringe 5 ml. The blood samples will be stored in EDTA bulb. Total WBC count, Differential leucocyte count (DLC) and Platelet count was done using CBC Automatic Analyzer in pathology laboratory.

Statistical Analysis: Unpaired t’ test of Microsoft excel 2007 was used to comparison of two groups. P value less than 0.05 was considered as significant.

RESULTS
50 healthy male non smokers and 50 male smokers were participated in this study, Total WBC count platelet count and Differential Leukocyte count (DLC) were compared in both group. There were insignificant different in age, height and weight in smokers and non-smokers, (Table-1) We observed insignificantly increased Total WBC count and Platelet count in smokers compared to non-smokers. For Differential count like Neutrophil, Eosinophil, Monocyte was insignificantly increased in smokers but lymphocyte count was insignificantly decreased. (Table 2)

Table 1: Gender-wise distribution of Mean values for age, height, weight, BMI

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Smokers</th>
<th>Non-smokers</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>39.16±11.61</td>
<td>36.66±12.56</td>
<td>p value &gt;0.05</td>
</tr>
<tr>
<td>Height</td>
<td>166.1±6.95</td>
<td>167.66±6.80</td>
<td>p value &gt;0.05</td>
</tr>
<tr>
<td>Weight</td>
<td>57.24±6.70</td>
<td>59.82±9.43</td>
<td>p value &gt;0.05</td>
</tr>
</tbody>
</table>

Table 2: Total WBC count, Platelet count and Differential leucocyte count in smokers and non-smokers groups

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Smokers</th>
<th>Non-smokers</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total WBC count</td>
<td>7118 ±1702.78</td>
<td>7008.80 ±1719.05</td>
<td>p value &gt;0.05</td>
</tr>
<tr>
<td>Platelet count</td>
<td>2.75 ±1.03</td>
<td>2.74 ±1.04</td>
<td>p value &gt;0.05</td>
</tr>
<tr>
<td>Neutrophil count</td>
<td>59.82 ±8.79</td>
<td>59.34 ±12.22</td>
<td>p value &gt;0.05</td>
</tr>
<tr>
<td>Eosinophil count</td>
<td>3.38 ±2.12</td>
<td>3 ±1.67</td>
<td>p value &gt;0.05</td>
</tr>
<tr>
<td>Monocyte count</td>
<td>3.72 ±2.04</td>
<td>3.26 ±1.56</td>
<td>p value &gt;0.05</td>
</tr>
<tr>
<td>Lymphocyte count</td>
<td>32.02 ±9.46</td>
<td>33.38 ±7.74</td>
<td>p value &gt;0.05</td>
</tr>
</tbody>
</table>

(* Non significant p value >0.05)

DISCUSSION
Total WBC count, Neutrophil, Eosinophil, Monocyte and Platelet count were insignificantly higher in smokers than nonsmoker, but lymphocyte count was insignificantly decreased in smokers. Multiple studied show that the mean WBC and neutrophil count are significantly higher in habitual cigarette smokers. Muhamad jamad haider examined the association between the smoking habit and the total leucocyte count and significantly high value of total leucocyte count in a group of clinically healthy smokers. Pyridine, benzene derivatives etc toxicants present in smoke leads to leucocytosis and neutrophilia. Cigarette smoking alters resting basal WBC count .The mean WBC count in adults non-smokers is 6400cells/µl and it is increased by over 1000cells/µl per packs of cigarettes smoked daily. Schwartz J et al. observed un-uniform distribution on differential count like disproportionately increased neutrophil count and decreased lymphocyte and eosinophil count. Smoking is also reported to cause of eosinophilia. McCue
et al\textsuperscript{15} and Quyang et al\textsuperscript{16} studied that cigarette smoke blocks both cytokine production and lymphocyte proliferation and thus acts like a combination of the best clinical immunosuppressive agents.

In our study, platelet count is increased. Smoking leads to activation of platelet and significant increase in blood clots due to element in smoke and smokers are likely to develop stroke. Smoking leads to about 1\% of all stroke death and relative risk of stroke in smokers 1.5 more than non-smokers\textsuperscript{17}. Those who smoke ≥ 20 cigarette a day have 2-4 times greater risk of stroke than non-smokers\textsuperscript{18}.

**CONCLUSION**

Our study shows that that Total WBC count, Neutrophil, Eosinophil, Monocyte and Platelet count were insignificantly higher in smokers than non-smoker, but lymphocyte count was insignificantly decreased in smokers. Continuous smoking alters blood parameters and may increase risk of clotting complication like stroke, heart attack, deep vein thrombosis or pulmonary thrombosis and developing atherosclerosis. Early cessation of smoking is beneficial and prevents hazards of complication of smoking.

**ACKNOWLEDGEMENT**

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13. Schwartz J, Weiss ST. The host and the environmental factors influence the peripheral blood leukocyte counts. AM j Epidemiology 1991;134(12):1402-9