Serum Triglyceride, Cholesterol and Fasting Blood Sugar in Male Rats Exposed to Oil Paint Vapor

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II. MATERIAL AND METHODS

A. Animals

Adult male Wistar rats weighting 200±30g were purchased and raised in our colony from an original stock of Pasteur institute (Tehran, Iran). The temperature was at 23±2 °C and animals kept under a schedule of 12h light: 12h darkness with free access to water and standard laboratory chow.

B. Protocol of Study

Male rats were randomly divided into control and exposed to oil paint vapor for 1h/day and 8h/day. After 10 weeks blood samples were collected using cardiac puncture method. Serum levels of fasting blood sugar, triglyceride, cholesterol and HDL measurement were performed using routine methods. Data were statistically analyzed and compared between groups using ANOVA. The results indicated that serum cholesterol level significantly decreased in rats exposed to oil paint vapor for 8h/day compared with control animals (p<0.01). Conclusively, exposure to oil paint vapor results in decreased serum cholesterol level that may result from a decrease in cholesteryl metabolism.

The blood sugar concentration or blood glucose level is the amount of glucose (sugar) present in the blood of a human or animal. The body naturally tightly regulates blood glucose levels as a part of metabolic homeostasis. With some exceptions[2-3], glucose is the primary source of energy for the body’s cells. Glucose levels are usually lowest in the morning, before the first meal of the day (termed "the fasting level"), and rise after meals for an hour or two by a few millimolar. Blood sugar levels outside the normal range may be an indicator of a medical condition.

Serum Triglyceride, Cholesterol and Fasting Blood Sugar measurement were performed using routine methods. Studies have shown that volatile emissions of chemicals may result in various disorders in our body. The main aim of this study was to determine the effects of oil paint vapor on Chol,TG and BS in male rats. In this experimental laboratory study, male Wistar rats were randomly divided into control and exposed to oil paint vapor for 1h/day and 8h/day. After 10 weeks blood samples were collected using cardiac puncture method. Serum levels of fasting blood sugar, triglyceride, cholesterol and HDL measurement were performed using routine methods. Data were statistically analyzed and compared between groups using ANOVA. The results indicated that serum cholesterol level significantly decreased in rats exposed to oil paint vapor for 8h/day compared with control animals (p<0.01). Conclusively, exposure to oil paint vapor results in decreased serum cholesterol level that may result from a decrease in cholesteryl metabolism.

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C. Statistical Analysis

All values are presented as mean±SD. Statistical significance was evaluated by one-way analysis of variance (ANOVA) using SPSS 19 and Tukey HSD Test as post hoc test.
III. RESULTS

Table I represents serum levels of fasting blood sugar, triglyceride, cholesterol and HDL in male control rats and rats exposed to oil paint vapor.

<table>
<thead>
<tr>
<th>Groups</th>
<th>BS (mg/dl)</th>
<th>TG (mg/dl)</th>
<th>CHOL (mg/dl)</th>
<th>HDL (mg/dl)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>128.2±43.5</td>
<td>139±28.8</td>
<td>102.2±6.6</td>
<td>61.4±2.9</td>
</tr>
<tr>
<td>1h/day</td>
<td>161.6±37.5</td>
<td>155.8±14.5</td>
<td>91.6±8.0</td>
<td>55.8±1.4</td>
</tr>
<tr>
<td>8h/day</td>
<td>179.8±22.5</td>
<td>144.6±21.1</td>
<td><em>NS</em></td>
<td>52.8±8.2</td>
</tr>
</tbody>
</table>

BS, TG, CHOL and HDL indicate fasting blood sugar, triglyceride, cholesterol, high density lipoprotein, respectively. NS (Non-significant difference) and P<0.01 are expressed compared to control rats and *NS (Non-significant difference) are expressed compared to rats exposed to paint oil vapor for 8h/day.

The results show that serum cholesterol level decreased significantly in rats exposed to oil paint vapor for 8h/day compared to control animals (P<0.01), however, fasting blood sugar, triglyceride and HDL did not significantly change in rats exposed to oil paint vapor for 1 and 8h/day compared to control rats.

IV. DISCUSSION

The results of current research show that exposure to paint odor results in decreased serum cholesterol level in male rats. Although odour pollution of air in small amount is not harmful to the health of man[10], the studies show that child and maternal household chemical exposure has a risk for healt [12]. Studies also show that occupational and environmental exposures to lead, one of the toxic metal pollutants presented in gasoline derivatives such as oil paints, may affects on cholesterol metabolism [13]. There is also study showing that exposure to diesel-water methanol emissions were not associated with neurotoxicity, reproductive developmental toxicity, or in vivo genotoxicity and only small decreases in serum cholesterol were observed [14]. It has been also shown that gasoline derivatives have adverse effects, the most significant of which included depression in weight gain in the males, and increased liver weight and hepatic microsomal enzyme activities in both sexes.

V. CONCLUSION

We have shown that exposure to oil paint vapor results in decreased serum cholesterol level that may result from a decrease in cholesterol metabolism.

ACKNOWLEDGMENT

This research has been done with the support of Islamic Azad University-Hamedan Branch. We appreciate all who helped us to exert the present study.

REFERENCES