

Hematological Profile of Painters: A Case – Control Study.

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ABSTRACT

Occupational diseases are often neglected due to its direct impact on a person's economy. Painters are at a high risk of developing alterations in their haematological profile, apart from respiratory and skin diseases. Our aim to study the haematological profile in painters and take preventive steps in order to improve their health. This case-control study was done in 30 painters and 30 non-painters in the Department of Physiology, S. N. Medical College, Bagalkot. Ethical clearance and informed consent were obtained. Blood sample was drawn from ante-cubital vein. Hemoglobin, RBC count, total and differential leucocytic counts, and platelet count of the painters and non-painters were estimated. The results obtained were compared between the two groups statistically using unpaired t test. This study revealed there were a decrease in hemoglobin and neutrophils, and a decrease in RBC, Platelet and total leucocyte counts in painters. An increase in eosinophils, lymphocytes and basophils was also noted in them as compared to non-painters. A check on these haematological parameters should be kept in case of painters in order to take preventive measures to improve their health.

INTRODUCTION

Occupational disease is surprisingly common. An estimated 860,000 illnesses and 60,300 deaths from workplace exposures occur annually in the United States [1]. Studies have found that 75 percent of hospitalized and ambulatory primary care patients report hazardous exposures, and 17 percent suspect that their illness is linked to their job. Work-related illness is diagnosed in approximately 10 percent of these patients [2,3].

Occupational diseases are often neglected due to its direct impact on a person's economy. Since the spectrum of occupational diseases is extremely broad, many conditions commonly encountered in primary care practice may be work related. A variety of respiratory diseases are also commonly occupational in origin [4,5,6].

Solvent exposure was a well-known health hazard to construction and house painters in previous decades. Painters may also be exposed to specific sensitizers, such as diisocyanates, isothiazolinone, formaldehyde or epoxides [7]. In a previous study, painters were found to be at increased risk of airflow obstruction [8]. Wieslander et al found that the incidence of self-reported asthma among painters using water-based paints was slightly higher than that of an industrial population [9].

Painters are also at a high risk of developing alterations in their haematological profile, apart from respiratory and skin diseases. Hence, the present study was undertaken to study the haematological profile in painters and take preventive steps in order to improve their health.

METHODS

This case-control study was done in 30 painters and 30 non-painters in the Department of Physiology, S. N. Medical College, Bagalkot. Ethical clearance was obtained from the institutional ethics committee and informed consent was obtained from the subjects. Healthy painters registered at the association of painters, Bagalkot, aged

more than 19 years were included in the study (Cases). Equal number of age and gender matched non-painters were taken as controls from the general population. Subjects suffering from any acute or chronic illnesses and on any drugs were excluded from the study. Blood sample was drawn from ante-cubital vein. Hemoglobin, Red blood cell count, total and differential leucocytic counts, and platelet count of the painters and non-painters were estimated, using semi-autoanalyser. The results obtained were compared between the two groups statistically using unpaired t test.

RESULTS

The mean age (in years) of cases and controls was 25.8 ± 10.7 and 26.3 ± 9.6 respectively. The mean number of years of exposure to paint in cases was 7.6 ± 7.6 and three smokers were noted in this group (Table 1).

Table 1: Characteristics of painters (Cases) and non-painters (Controls)

	Cases (n=30)	Controls (n=30)
Mean Age (years)	25.8 ± 10.7	26.3 ± 9.6
Years of exposure	7.6 ± 7.6	Nil
Smokers (Number)	3	Nil

There was a statistically significant decrease in hemoglobin and neutrophils; and a non-significant decrease in RBC, platelet and total leucocyte counts in painters. An increase in eosinophils, lymphocytes and basophils (not significant) was also noted in them as compared to non-painters (Table 2).

Table 2: Hematological profile of painters (Cases) and non-painters (Controls)

Variables	Cases (n=30)	Controls (n=30)	t	p
Hemoglobin (gm%)	13.2 ± 1.39	15.03 ± 0.70	-6.29	0.001*
RBC count (million/cu.mm)	4.5 ± 0.60	4.8 ± 0.46	-1.81	0.76
Total leucocyte count (10^3 /cu.mm)	6.9 ± 1824	7.2 ± 2189	-0.44	0.65
Neutrophils (%)	57.5 ± 11.3	63.13 ± 8.8	-2.1	0.03*
Lymphocytes (%)	36.04 ± 9.5	33.07 ± 8.6	1.2	0.2
Eosinophils (%)	5.13 ± 4.6	4.03 ± 2.3	1.1	0.24
Monocytes (%)	1.27 ± 0.94	0.90 ± 1.15	1.3	0.18
Basophils (%)	0.03 ± 0.183	0.00 ± 0.00	1	0.32
Platelets (lakh/cu.mm)	2.5 ± 0.50	2.48 ± 0.69	0.32	0.83

*Statistically significant

DISCUSSION

Hematologic parameters give us a view of the internal environment of the body. Lead present in the paints, has mainly negative effects on nervous system and hematopoietic system. Exposure to paint has a deleterious effect on bone marrow. These effects may result in a decreased production of red blood cells, white blood cells, and platelets. A decrease in RBC count and hemoglobin may be due to retarded hemopoiesis, destruction or shrinkage of RBC caused by the constituents of paint. An increase in lymphocyte count could be a direct stimulatory effect of the toxic substances on the lymphoid tissues. Neutrophils are involved in phagocytosis of foreign chemicals and hence, their count is likely to be reduced [10].

In a study, varying concentrations of nitrocellulose thinner were orally administered to male albino rats, as single daily dosage for 30 days, to assess the haematological changes associated with oral exposure to solvent. The results showed a significant dose-dependent decrease in Red Blood Cells (RBC) count, haemoglobin (Hb), Packed Cell Volume (PCV), Mean Corpuscular Volume (MCV), Mean Corpuscular Haemoglobin (MCH), Mean Corpuscular Haemoglobin Concentration (MCHC), neutrophils and increase in total White Blood Cells (WBC), platelets and lymphocytes, compared to the control. However, there was no significant difference in the changes in the level of these parameters in rats exposed to 10 mg kg^{-1} when compared to the rats exposed to 15 mg kg^{-1} and 20 mg kg^{-1} when compared to the rats exposed to 25 mg kg^{-1} of the solvent [11].

Occupational toxicity due to the effect of pollutants at work place is of basic importance because of the time factor, lasting about 8 hours daily. A study was directed to explore the hazardous effect of occupational exposure to air pollutants arisen from benzene station. A total of 48 albino rats were classified into three groups each of sixteen rats. Groups one and two were kept at a benzene station for 60 and 120 days, respectively and the third group was kept as a control under laboratory conditions. After termination of the experiment, animals were sacrificed and blood samples were collected for hematological and biochemical investigations. Results indicated a pronounced time-dependent reductions in RBCs, Hb, PCV, total and differential (neutrophil and lymphocyte) leucocytic counts [12].

CONCLUSION

A check on these haematological parameters should be kept in case of painters in order to take preventive measures to improve their health.

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