

Biochemical parameters of paint workers in Puducherry

Abstract

Studies have identified that workers in paint industries are vulnerable to disorders due to the exposure to toxic chemicals and solvents. Such disorders are often missed. Social health security is incomplete, especially in our country, until such issues are addressed. Our aim was to study the alterations in biochemical parameters among paint workers in comparison with healthy subjects, in Puducherry. It was a cross-sectional study with 2 groups. Group A comprised 17 paint workers and Group B, 10 healthy controls in Puducherry. Blood samples and urine samples were collected from both the groups. All blood and urine parameters were estimated using an automated biochemical analyzer. Statistical analysis was employed. Our study showed adverse renal parameters ($P < 0.05$) in the paint workers as compared with the control group. Contrary to conventional expectation, our study did not show evidence of obvious liver damage.

Key words:

Biochemical, paint workers, parameters, Puducherry

Introduction

Paint workers belong to the unorganized, unskilled sector. The majority of them do not have a regular employment. They find employment only in the organized sector as casual/daily-rated workers. Hence, their safety, security, and rights are not appropriately addressed. We decided to generate the component of "Welfare biochemistry" and address their health concerns, by exploring a few biochemical parameters that are likely to identify some, if any, of the toxicity associated with this profession. Very few studies^[1,2] portray the vulnerability of paint workers to several diseases, due to the toxic chemical exposure.^[3]

Our study aimed to find out the alterations in biochemical parameters among paint workers in comparison with healthy subjects, in Puducherry.

Materials and Methods

Two groups were identified for the study. Group A comprised 17 paint workers and Group B comprised 10 healthy controls. Both were age and sex matched. All subjects were

males. This was a cross-sectional study involving 2 groups who were apparently normal. Detailed histories were taken, including smoking, alcohol, duration in the occupation, previous hospitalization, and so on. Whole blood samples were collected in EDTA tubes and hemoglobin was estimated by (Mind Ray, Shenzhen, China) BC-2800 Automated Haematology Analyzer by flow cytometry method.

Blood was collected in clot activator tubes, and serum separated. Estimation of random glucose, urea, creatinine, uric acid, total protein, albumin, aspartate transaminase, alanine transaminase, alkaline phosphatase, gamma-glutamyl transferase, and total and direct bilirubin were done by (Hoffmann-La Roche Cobas Mira plus, Basel, Switzerland) EIA RS-232 Automated Biochemical Analyzer. Spot urine samples were also collected to estimate creatinine and microalbumin. Results were analyzed using standard statistical methods.

Results

Aspartate transaminase, creatinine, and urea were

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Table 1: Statistical measures of different variables compared between the 2 groups

Variables	Group A (Mean±SD)	Group B (Mean±SD)	P Value	r Value
Age (years)	39.6±12.3	46±13	0.17	0.3
Systolic (mmHg)	121±18	124±9	0.6	-0.4
Diastolic (mmHg)	78±13	77±7	0.7	0.4
Pulse (per minute)	77±7	77±4	0.8	0.5
Hemoglobin (g/dL)	13.7±1.8	14.6±0.5	0.08	-0.19
Random blood glucose (mg/dL)	106±24	95±15	0.12	-0.33
Urea (mg/dL)	27±6	20±3	<0.001	0.6
Creatinine (mg/dL)	0.8±0.2	0.7±0.1	<0.05	0.4
Uric acid (mg/dL)	4.5±2.1	3±0.6	<0.05	-0.18
Total protein (g/dL)	7.6±0.5	7.4±0.4	0.17	-0.38
Albumin (g/dL)	4.4±0.6	4.8±0.4	<0.05	-0.4
Aspartate transaminase (IU/L)	31±10	22±3	<0.001	-0.42
Alanine transaminase (IU/L)	27±12	22±3.7	0.09	0.4
Alkaline phosphatase (IU/L)	54±11.2	49±15	0.3	0.1
Gamma-glutamyl transferase (IU/L)	14±7	13±4	0.3	-0.13
Total bilirubin (mg/dL)	0.6±0.3	0.7±0.2	0.4	0.3
Direct bilirubin (mg/dL)	0.2±0.1	0.3±0.1	0.15	-0.88
Urine creatinine (mg/dL)	27±24	22±12	0.33	-0.27
Urine microalbumin (mg/L)	7.3±6	7.5±3	0.7	0.5
Glomerular filtration rate (modification of diet in renal disease) (ml/min/1.73 square meter)	116.2±43.5	140±17.4	<0.05	0.08

Statistical significance was set at $P < 0.05$ using Student's *t* test

significantly ($P < 0.001$) higher in paint workers than in healthy subjects [Table 1]. Albumin and uric acid were lower ($P < 0.05$) in Group A in comparison with Group B. Glomerular filtration rate using modification of diet in renal disease formula, was significantly lower ($P < 0.05$) in Group A than in Group B. Our study thus, shows adverse renal parameters in paint workers. Major liver parameters, such as alanine transaminase, alkaline phosphatase, bilirubin, total protein, gamma-glutamyl transferase, were statistically insignificant ($P > 0.05$).

Discussion

Contrary to the conventional expectations,^[4] our study did not show evidence of obvious liver damage. Further study with a larger sample size would be required to substantiate our findings. Moreover, a prospective study with analysis of renal parameters at regular intervals might probably strengthen the above findings. This would also help the economically deprived paint workers, an opportunity to

know about their health status. Thus, we conclude that the alterations in renal parameters are more significant in the given setting of the study.

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