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Study of some Biochemical Changes in the Blood Serum of Sadet-Al-Hindiah/Cement Factory Workers /Babylon/Iraq

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Abstract

This study included the investigation of (GPT) (Glutamate pyruvate trans aminase and (GoT) Glutamate oxaloacetate , ALP (Alkaline phosphatase, cholesterol, protein, albumin.TGs, HDL and some minerals such as Ca,Na and K The study included male and female workers distributed in two group the first group included cement workers , where as the second group was control group.The results revealed significant increasing in TGs, cholesterol, AlP and GoT for cement workers (males and females) as compared in control group ($p<0.05$) where as a significant increasing indicated in protein,albumin and GPT for females as compared in control group .The results also showed a nonsignificat increasing in Ca,Na and K concentration Generally female cement workers more affected in cement pollution than male workers .

Keywords: *GPT, GoT etc.*

Introduction

The major pollution problem in the cement industry is dust, which is emitted from various parts of the production process such as the raw material crusher rotary,kiln,cranes,mills,strong soils and packing sections. Airborne respirable dust levels from less than 5 to more than 40m /m3 have been recorded in the work place air of cement factories (fair hurst 1997).

The aerodynamic diameter of the cement dust ranges from 0.05 to 20 µm ,making the whale respiratory tract atarget for cement deposition (0 leru 1984).

Deposition of cement dust in the respiratory tract causes a strong basic reaction leading to increased ph value (13.5 - 13.0) that irritate the exposed mucous membrane (Dietz et al 2004) .

Furthermore, calcium and aluminum found in cement dust have been shown to irritate mucous membrane (AGGH 2000).

Industrialization is central to economic level, and improved prospects for human wellbeing. If proper abetment technology is not used,in dusty becomes a major source of air and water pollution.

Industrial operations have the potential to effect the health of work forces and the general environment there by impacting negatively on the health of nearby populations and sometimes the populations that are farther away(Aydin et al 2010)

Cement dust contains heavy metal like nickel, cobalt, lead, chromium , pollutants hazardous to the biotic environment , with adverse impact for vegetation ,human and animal health and eco systems (Baby et al2008).

Occupational cement dust exposure has been associated with increased risk of liver abnormalities , pulmonary disorders and carcinogens is decreased antioxidant capacity increased plasma lipid antioxidation have been posed as possible causal mechanisms of diseases (zeleke and et al 2010).

Cement industry is one of 17 most polluting industries listed by the central pollution control board.

Nickel, zinc and lead are commonly found in cement in non-negligible concentration (Berker 2011).

The aim of this study is to investigate some biochemical parameters in the blood of selected cement workers and the residents of distant communalities away from the cement plant which served as the controls.

Materials and methods

The study was conducted at portland cement factory in Al-sadah / Babylon Governorate between June – Augest 2010.

The workers were classified into two groups males and females compared with un exposed control groups males and females (age range between (25 - 60) were voluntary to participate in the study .

Collection of blood

5ml of venous blood was obtained from the antecubitalvien using disposable pyrogen – free needle and syringes.

The blood samples were dispensed into plain vascutainer tubes containing EDTA to prevent coagulation. Samples were kept frozen at -20c° until analyzed.

Table 1 Effect of cement pollution on some biochemical parameters in serum of cement workers.

L.S.D		control		Cement workers		parameters
female	male	female	male	female	male	
1.42	N.S	62	76	66	78	Protein 100 ml/mg
5.4	N.S	48	37	32	35	Albumin mg/100 ml
0.92	0.01	1.2	0.7	3	2.9	TGs mmol/L
0.72	1.02	4.8	3.2	5.6	4.2	Cholesterol mmol/L
N.S	N.S	0.8	0.9	0.7	0.8	HDL
0.72	0.65	78	67	85	80.6	AlP(u/L)
0.46	N.S	12	13	18.3	13.3	GPT(Iu/L)
2.4	0.87	16	21	23.6	19	GoT(Iu/L)
N.S	N.S	12	13.2	12.2	13.3	Ca mg/100 ml
N.S	N.S	13.9	14.7	13.5	14.5	Na mg/100 ml
N.S	N.S	17.6	17.8	17.6	18.2	K mg/100 ml

Determination of cholesterol

Cholesterol was determined enzymatically according to method decribed by (Allian et al 1974)

Determination of serum TGs

TG concentration was determined enzymatically according to the method described by allianfossaation and prencipe (Buccolo .G.1973) method.

Estimation of protein

Serum levels of protein was calculated according to method of saliva et al (1988).

Estimation of Alkaline phosphate

ALP was calculated by using a BioNERiEuX company france kit .

Estimation of albumin

The (BCG) method is based on the specific binding of Bromo cresol Green according to (Doumas et al (1971).

Estimation of HDL (High density lipoprotein)

HDL was calculated enzymatically according to (Burstein , et al 1970

Estimation of GoT and GPT

GoT and GPT were estimated according to Al-umary (1980)

Estimation of Na,Ca and K

They calculated by using flame photometry.

Statistical analysis

The differences betwen samples were calculated by using least significant difference (L.S.D) according to (Schefler1980).

Results and Discussions

It is obvious from the result in table -1- that mean of serum total protein for cement workers (males and females) were 78 and 62 g/L sequency where as , the variation was not significant pc 0.05 for male as compared to control group where as it significant in females serum protein are affected by many factors and certain proteins are changed during the acute phase-response (Aydin et al 2010).

The results indicated there was significant increase in albumin for female cement workers as compared to control group. occupational cement dust exposure has been associated with an increased risk of liver abnormalities plumonary disorders and carcinogenesis , decreased antioxidant capacity (Aydin et al (2010).

The results also showed significant increase $p<0.05$ in TGs and cholesterol for males and females as compared in control group , about 70% of the cholesterol in the lipoproteins of plasma is in the form of cholesterol , cholesterol TGs and LDL levels may have a role in disease involving oxidative damage (Aydin et al 2010).

Non significant decrease $p<0.05$ showed in HDL as compared in control group,HDL serve as a source of other lipoproteins as the site of action for conversion of cholesterol to cholesterol-ester in the plasma by lecithin cholesterol acyl transferase , it is commonly called the good cholesterol (Brener 2004).

The results demonstrated that there was significant increase in Alp activity $p<0.05$.

Alp increasing activity might be due to dermal contact or indirect ingestion, some of them are toxic and might interfere with enzyme system and metabolism of th body (Arogunjo 2007). There was asignificant increasing in GoT $p> 0.05$ for males and females workers as compared in control group.

GoT raised in acute liver damage (Aydin et al 2010).

No significant increase showed in GPT for male worker where as significant in female as compared in control group $p<0.05$.

Lately the results indicated anon significant increase in calcium , potassium and sodium ion level in the serum of cement workers $p>0.05$ as compared in control group , this result is dis agree with fatima et al1997 , who found significant effect.

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