Effect of Smoking on Ratio of K, Na, Ca, P & CL of Baghdad City Smokers

Nahlah F. Makki

Department of Chemistry, Faculty of Science, University of Kufa, Iraq.

Abstract

In this present paper ,the effect of cigarette smoking for several years ranging from 5 to 30 years on the levels of K,NA, CA,P and CL in blood of smokers were performed by C 4000 Auto analyzer .Two hundred of samples were included in this study , hundred specimen as a control group (non-smoking ),mean age 37 years and other hundred as smokers group mean age 38 years . The results elucidated that the ratio of Ca, P and CL were not affected by smoking while sodium ions decrease in the serum of smokers compared to non-smokers and found that potassium ions are increasing at normal rates, it was also not found relationship between the period of smoking and the concentration of elements. Therefore, you must avoid smoking, causing a change in the normal rates of essential elements of the body sodium and potassium and thus change in the work of hormones related to those elements Such as the hormone aldosterone, which leads to the occurrence of various diseases such as kidneys and stomach.

Keywords: Cigarette, smoking, sodium, potassium.

Introduction

The human body contains the necessary metal elements of the vital activities, including interference in enzymatic reactions and other have the ability to grant or gain electrons in redox reaction which is necessary in energy production. [1, 2].

Among these elements K, NA, CL, P and Ca, despite the importance of these elements, but their departure from normal rates lead to many diseases, the imbalance in the rate occurs due to different factors and among these factors is smoking.

Different studies have been conducted on the effects of smoking on human health. In 2010by Al-Shalah , the study was completed on the twenty sample as standard group , 20 light smokers (< ten cigarettes per a day) and 20 heavy smokers (> ten cigarettes per a day), the results indicated that smoking in light or heavy affects the characteristics of the high density lipoprotein cholesterol(HDL) which leads to increased atherosclerosis disease [3].

Dimitra E. Kareli and other's group in 2012, To Find an effect smoking of pre-pregnancy on fetuses And their mothers , the results were obtained peripheral blood of twenty women who quit smoking during pregnancy.

The search illustrated that A similar increase in sister chromatid exchanges was observed in both non-smoking and smoking mothers [4] In October 2012 Andreas D. Flouris et al. performed research about effects of electronic and non-electronic cigarette smoking on complete blood count (CBC), The Work included taking two groups 15 smokers and 15 nonsmokers, and Smokers suffer a control séance of an active to non-e-cigarette smoking and e-cigarette smoking. Never smokers underwent a monitoring seance, a passive tobacco cigarette smoking, and a passive electronic cigarette smoking, It has been shown that the results (CBC) increase white blood cell, lymphocyte and granulocyte of tobacco cigarette smokers, while no changes were made to electronic cigarette smokers [5].

In 2017 Carroll, A. J. et al. The group studied the relationship between smoking and psychological depression with cardiovascular disease and the possibility of a coronary artery injury in young people. The results illustrated that exposure to smoking and depression for long periods lead to heart disease [6]. Also ,Farah, N.M., Elmahdi (2017), The researcher and her group concluded from this study that the smoking
increase the renal biologic indicators, leading to the risk of kidney failure. It was conducted on Elriada Center in Khartoum state during the period of search 8 months, 90 samples, 30 control (non-smokers) and 60 smokers, your aged 22-71 years, where it has been measured Cystatin c, Creatinine and microalbuminuria.[7]

**Subjects and Methods**

This study was carried out over a period of 6 months, from January-June 2017 in al-Tab city / Baghdad and the volunteers were randomly chosen for participate in study. Subjects involved were two groups: the first included one hundred (74 male + 26 female) were taken as a control group, mean age and standard deviation (37.5 ± 11.4). The second included one hundred males, mean age and standard deviation (38 ± 9.8). All subjects who had free from acute and/or chronic disease e.g. (Hypertension, Diabetes, cardiac or occupational diseases), elemental analyses (K, Na, Cl, P and Ca) were performed on C 4000 Auto analyzer (Architect plus).

Centrifuge separation obtained with Burker 400MHz (Switzerland).

The experimental work is carried-out in the Laboratory of the al-Tab city.

The procedure divided for two steps:

**Samples Blood Collection**

- Blood sample were taken from the cubital vein directly from volunteers, using medical nidel.
- After the sample blood when transporting to test tube then in water bath for 10 min at 25°C for clotting completing and avoid test tube moving until decomposing blood accent.
- Using centrifuge for separation the serum for 10 min., take 0.5 ml of serum and put it in dry test tube by micropipette then in reck of instrumental analysis. [8]

**Analysis of Samples**

The analytical samples by using Auto Analyzer (C 4000).

---

**Statistical Analysis**

Statistical analysis was performed on PC using SPSS V.21, Data are presented as arithmetic mean ± S.D., with subsequent use of student t-test, p. value > 0.05 was considered as significant.

**Results**

The study showed that the smoking causes increase on ratio of K while happened decrease Na level in human blood, no change has occurred on the ratio of Cl, P and Ca under research conditions, because the cigarette tobacco has many chemical compounds about 400 which are actually poisons such as nicotine and cyanide subsequently lead change on hormones which affects on the ratio of Na and K and occurs biological change, these result illustrated in Fig. (2), (3) and (4).

The project also demonstrate that no relation consecutively between a period of smoking (age the smoking) and change concentration of Na and K.
Fig. 2: Na conc. (m mol/L) of smokers and nonsmokers (con.)

Fig. 3: K conc. (m mol/L) of smokers and nonsmokers (con.)

Fig. 4: Shows no smoking effect on levels of P, Cl and Ca

Discussion
Become clear from this study the smoking causes increase on ratio of K while decrease Na rate, This is due to the destruction of cells responsible for the secretion of bicarbonate a base, to buffer the fluid, by the chemicals found in tobacco cigarettes, which leads to increased acidity and the occurrence of stomach ulcers in smokers, this is what found Li. L. F., et al. (2014) [9] In your study also, Konturek, Stanislaw J., ET (1971) [10], and decrease sodium concentration by following the equation below:

\[ \text{NaHCO}_3 + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2\text{CO}_3 \] [11]

While the proportion of potassium will increase where the relationship is reversed between these two elements where the
hormone Aldosterone regulate blood levels. Rossier, Bernard et al (2013) [12].

**Conclusion**

- The chemicals in the sugars affect the secretions of the stomach, which leads to increased acidity of the stomach and thus decrease the concentration of sodium and increase the concentration of potassium.
- Smoking does not affect the concentration of phosphorus, chlorine and calcium.
- The number of years of smoking does not affect the concentration of ions.

**References**


