A comparison clinical study between Water-Pipe and cigarettes males smokers on serum lipid profile and blood hemoglobin concentration in the Thi-Qar governorate

Mohammad Q. Sultan*
College of Dentistry, University of Al – Ayen , Thi-Qar, Iraq.
* Mohammed_Alkhuzaie @ yahoo.com

Abstract: 20 samples of each non-smoking (group A, as a standard case), smoking cigarette (group B) and smoking water pipe (group C) were studied, respectively at Thi-Qar Governorate between 1st Jan. 2017 till the end of Feb. 2017. The average ages of all groups ranged between 25 and 40 years and all of them do not suffer of any genetic disease (i.e. sugar diabetes and high blood pressure). Both, the blood hemoglobin concentration (Hb) and serum lipid profile were measured for groups A, B and C, respectively. The results indicated the presence of relative increase (p <0.05) of Hb in group B as compared with group A. In order of C > B > C Furthermore, it was found that there was a relative increase (p <0.05) in Hb of group C as compared with both groups A and B. With respect to the serum lipid profile, the result showed the presence of a relative increase (p <0.05) in the concentrations of total cholesterol in group (B) as compared with group (A) while there was a relative increase (p <0.05) in group (C) when its compared with both groups A and B. By considering the concentrations of triglyceraldehyde (TG) in group (B), it was noticed that there is no relative increase (p <0.05) as compared with group (A) while there was an relative increase (p <0.05) of group (C) in comparison with both groups (A and B). In the case of high density lipoprotein (HDL) it was found that there was non-relative decrease (p <0.05) in the human body concentration as compared with group (A) while there was a relative decrease (p <0.05) in the concentration of (HDL) with the group (C) as compared with group (A) but in comparison of such result with group (B), it was found that there was non-relative decrease (p <0.05). As for as the low density lipoprotein (LDL) is concerned, an relative increase (p <0.05) was found with both groups (B and C) as compared with group (A). Also it was noticed that a non-relative increase was indicated with group (C) when it was compared with group (B). Finally, the results showed a non-relative increase (p <0.05) in concentration (vLDL) with both groups (B and C) as compared with group (A). But in comparison between groups (C and B) it was found that there was a relative increase (p <0.05) with group (C).

1 Introduction

The electrochemistry of tellurium and its compounds has been studied since the 1920s and various mechanisms for the reduction of Te IV to Te e have been given[1]. Such behavior is complicated due to several oxidation states of tellurium and its electrochemical reduction is a multielectronic process[2,3]. A comprehensive review on the oxidation and reduction processes of organic tellurium compounds, including many results of electrochemical investigations, was reviewed by Detty and Logan[4]. However, electrode syntheses of organoselenium and organotellurium compounds were not discussed there. A recent review by Jaworski[5] discussed the preparation of new organic selenium or tellurium compounds by anodic functionalization of already available chalcogen compounds and the electrochemical synthesis in which organic selenium compounds play only the role of intermediates or catalysts. Furthermore, Tellurium can be
cathodically reduced in acid solution to give hydrogen telluride or in alkaline solution to give Te$_2^{2-}$ and possibly Te$^{2-}$ ions. Also, it can be oxidized anodically to give (TeO$_2$) or telluric acid (H$_6$TeO$_6$)[6]. Various electrochemical techniques such as linear potential scan, cyclic-voltammetry and controlled potential coulometry for diorganyl tellurides, diorganyl tellurium dichlorides and diperchlorates in methylene chloride or acetonitrile containing tetrabutyl ammonium perchlorates as supporting electrolyte indicated that dichloride and diperchlorate were electrochemically reduced to the corresponding diorganyl tellurides [7]. Also, it was found that diphenyl ditelluride was electro-oxidized to PhTe(ClO$_4$)$_3$ in the presence of ClO$_4^-$ ions, while (C$_6$H$_5$OH)$_2$TeTe(C$_6$H$_5$OH) can be oxidized to (C$_6$H$_5$OH)$_2$Te(ClO$_4$)$_2$ and elemental Te[8]. Many phenyl chalcogen derivatives have been synthesized electrochemically by the reduction of o- and m- chlorobenzonitrile in the presence of an equivalent amount of PhE prepared initially by electrochemical reduction of PhEEPh (E= Te or Se) to form phenyl chalcogen benzonitriles[9]. Symmetrical aromatic ditellurides were prepared by electrochemical reduction of unsymmetrical organic telluride. As an example, dicyanodiphenyl ditelluride has been prepared by anodic oxidation of cyanobenzene tellurate anion[10]. The direct cathodic reduction of unactivated alkyl halide in acetonitrile in the presence of an equivalent of PhE lead to ArEPb[11]. Diorganyl ditellurides and diorganyl diselenides were prepared electrochemically from a reaction of alkyl halide or aryl halide with elemental Se or Te, which were used as sacrificial cathodes[12]. Anodic oxidation of various types of organic tellurium compounds was carried out in the presence of fluoride ion, which gave the corresponding diorganyl tellurium difluorides (ArRTeF$_2$) with a high selectivity [13]. In the present work, electrochemical behavior of diphenyl ditelluride, bis(2-amino-5-methyl phenyl) ditelluride and bis(2-amino-5-bromo phenyl) ditelluride will be investigated by cyclic voltammetry in methanol or THF. Attempts will be made to prepare some new unsymmetrical tellurides electrochemically.

2 Experimental

A smoking is a major cause of many diseases over time. Furthermore, the World Health Organization (WHO) reported that four million people died as a result of smoking, this may rise to more than 10 million people in 2030 [1]. Water pipe was thought that it would be less harmful than the smoking of tobacco. Thus, it became increasingly popular across the world and especially Arab world among adults aged between 18 - 40 years [2]. It was found that more than 19 chemical substances in the tobacco of water pipe which caused cancer and many of other genetic mutations [3]. It is worth noting that addicts are more vulnerable to the risk of infectious diseases such as cancers, tuberculosis, arteriosclerosis, cardiovascular and hepatitis as a result of the succession of mouths to water pipe hose [4-6]. The previous studies showed that the proportion of high-density lipoprotein (HDL) decreased while the low-density lipoprotein (LDL) increased for smoker in compare with non-smoking people [7]. The present work describes the lipids profiles (HDL, LDL, TG, Cholesterol) for smoker and non-smokers of cigarettes and water pipe and presented.

3 Materials and Methods:

Samples were collected from January 2017 until the end of February 2017. Samples were taken for 20 male smoking water pipe (Group A), 20 samples of male smoking cigarettes (Group B) and 20 samples of male non-smoking (Group C). The average age for the three groups were between 25 – 40 years old. All 60 people do not suffer from the well-known genetic diseases (diabetes and high blood pressure).

3.1 The collection of blood samples:

The samples were withdrawn from the venous blood of each group (A, B and C) by using sterile medical syringes which divided into two sets of test tube:

Group 1: 1 ml of blood in EDTA test tube for hemoglobin tests.

Group 2: Factors (TG, HDL, LDL and vLDL) and were not taking any medications, the last meal before taking samples was 2-3 hours.

3.2 Laboratory investigation: 5 ml blood samples were obtained, serum was obtained by centrifugation of 4 ml of blood for biochemical tests.

3.3 Biochemical investigation: TG, HDL, LDL and vLDL were determined on serum by using (Cobas c 111) device.

3.4 Hematological investigation: Hemoglobin concentrations, were determined on blood with anticoagulant test tube by using (Dongel CBC – 50).

4 Results

4.1 Effect of smoking for concentrations of hemoglobin blood
Table (1) showed, the results indicated the presence of relative increase (p <0.05) in (Hb) in the group B as compared with group A. Furthermore, it was found that there as a relative increase (p<0.05) in (Hb) of group (C) compared with both groups A and B.

4.2 Effect of smoking on Lipid profile

For through results Table (1) showed, With respect to serum lipid profile, the results showed the presences of a relative increase (p <0.05) in the concentrations of cholesterol with group (B) as compared with group (A) while there was a relative increase (p <0.05) with group (C) when its compared with both groups (A and B). By considering the concentrations of triglyceraldehyde (TG) in group (B), it was noticed that there is no relative increase (p <0.05) as compared with group (A) while there was an relative increase (p <0.05) of group (C) in comparison with both groups (A and B).

In the case of high density lipoprotein (HDL) it was found that there was nonrelative decrease (p <0.05) in the human body concentration as compared with group (A) while there was an relative decrease (p <0.05) in the concentration of (HDL) with the group (C) as compared with group (A) but in comparison of such result with group (B), it was found that there was nonrelative decrease (p <0.05).

As for as the low density lipoprotein (LDL) is concerned, in relative increase (p <0.05) was found with both groups (B and C) as compared with group (A). Also it was noticed that a non-relative increase was indicated with group (C) when it was compared with group (B).

Finally, the results showed a non-relative increase (p <0.05) in concentration (vLDL) with both groups (B and C) as compared with group (A). But in comparison between groups (C and B) it was found that there was a relative increase (p <0.05) with group (C).

Table (1): Effect of smoking (cigarette and water pipe) on hemoglobin concentration and lipid profile and compared with standard group.

| Group | Chol [mg / dl] (mean , ± SD) | TG [mg / dl] (mean , ±SD) | HDL [mg / dl] (mean , ±SD) | LDL [mg / dl] (mean , ±SD) | VLDL [mg / dl] (mean , ±SD) | Hb [gm / dl] (mean , ±SD) |
|-------|------------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| A     | 119.7 ±25.8                  | 63.3 ±36.2                | 48.4 ±17.93               | 58.6 ±16.8                | 12.66 ±7.2                | 12.95 ±0.8                |
| B     | 139.1 ±15.7                  | 73.5 ±32.2                | 38.1 ±8.78                | 86.3 ±16.1                | 14.7 ±6.4                 | 14.2 ±0.8                 |
| C     | 155.5 ±20.54                 | 102.8 ±23.8               | 35.16 ±8.63               | 99.7 ±15.1                | 20.5 ±4.7                 | 15.2 ±0.9                 |
| LSD   | 15.83                        | 29.3                      | 11.8                      | 15.1                      | 5.8                       | 0.8                       |

A : Standard group.

B: Cigarette group.

C: Water pipe group.
Discussion

The effect of smoking on total on hemoglobin concentration which accompanied with a relative increase for people both groups (B and C) compared with group (A) for non-smoking people, can be attributed to the decrease in the packed cell volume (PCV) or it may be due to the increase in red blood cell (RBC) because of deficiency in supplying the blood with appropriate oxygen, the weak bonding between oxygen and blood (HB – O) as well as to the extra bonding of carbon dioxide (CO) with blood (HB – CO). Which definitely lead to the blood poisoning and increasing of its viscosity. Such result are founded in the literature[8].

The relative increase of lipid profile in the bodies of smokes in comparison with those of standards cases (group A) can be attributed to various mechanisms which lead to a change in the lipid profile that concentrated with the body. The most important of these changes may be classified in to the main reasons, Firstly, the increase in oxidant products with lead to corresponding increase in the level of fats in the blood because of nicotine substance will increase present of oxidants which in turn liberated excess of free radicals. Such process will attack the fats of cells membranes which proceed to the liberation of Malondialdehyde, (MDA) leading to the damage of blood vessels and tissues. The same conclusion is confirmed where [9].

Secondary, the high level of oxidants in the smokers will participate in increasing the oxidant molecules of LDL which cases its accumulation on blood vessel walls [10].

Among other mechanisms, the smoking will give rise to the absorption of nicotine in the human body which in turn causes the destruction of fats leading to the liberation of free fatty acids (FFA) to the blood stream due to the activation of Adenylylcase already present in adipose tissue, through the secretion of activated nicotine to the Catecholamines. Further, the excess of FFA in the liver will lead to the accumulation of TG in it accompanied by synthesis of vLDL which give rise to the increase of TG and vLDL in the blood [11]. Also, the smoking will catalyzed the Sympathetic nervous located in adrenal gland, (Adrenal-sympathetic system) which mainly increase secretion the Catecholamines hormones (i.e. adrenalin and Noradrenalin) which lead to increase in both lipase and concentration of free fatty acid in blood resulting to an excess of secretion FFA, TG and vLDL [12]. The smoking may causes an increase in total cholesterol, LDL, TG and vLDL due to the inhibition of Lipoprotein Lipase activation [13].

Finally, results showed a decrease in the level of HDL in both groups (B and C) in comparing with group (A). The reason may be attributed to that, the smoking will cause an decreased in the levels of Estrogen hormone which operates on decreasing oh HDL. This is in coincidence with the conclusion given in reference [14].
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