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Evaluation of Biochemical Parameters on Tobacco Chewers in Different Age Related Groups

Lakshmanan G[1], Saravanan D[2], Selvam R[3]
[1]Bharath Institute Of Higher Education And Research, Selaiyur, Chennai
[2]Associate Professor,Department of Biochemistry,DG Vaishnav College, Arumbakkam, Chennai
[3]Assistant Professor,Department of Biochemistry, Bharath Institute of Higher Education and Research,Selaiyur, Chennai

ABSTRACT

Background: Tobacco chewing and alcohol abuse are accepted as 'two-hit' hypothesis of cardiac arrest and liver disease. However, there are few research articles on identifying genes which connect lipid and glucose metabolism by liver markers enzymes.
Objectives: To diagnoses of alcoholic liver disease were made based on the combination of history of tobacco chewing, alcohol abuse and increased levels of liver enzymes, in the absence of other causes for liver disease.
Methods: To analyse the human serum marker enzymes of alcoholic fatty liver disease was established by different habit human samples estimate the expression of liver marker enzymes were determined using the automatic biochemical analyser.
Results Blood glucose levels were significantly increased and may be due to hyperglycemia in blood system. Protein levels were moderately decreased, indicating rate of protein catabolism in tobacco chewers. Urea levels were increased due to increase rate of protein catabolism this inturn lead to increased excretion of urinary nitrogen. Level of creatinine are increased may be due to the reduction of muscle mass during aging. Elevated levels of uric acid were due to hyperuricemia. Cholesterol levels were significantly enhanced whereas HDL cholesterol was significantly decreased in tobacco chewers. The increasing serum cholesterol may be due to increased LDL and VLDL.
Conclusions: Chewing tobacco could result in significance greater deleterious cardiovascular effects due to cholesterol, glucose, LDL and low HDL cholesterol in tobacco user as compared to tobacco non – user.

Keywords:
Triglycerides, Nicotine, Lipids metabolism, Glucose metabolism

1. Introduction

Now a day's most people are addicted to alcohol consumption and tobacco chewing, which lead to loss of function of liver, heart and lungs. In this present investigation about role of liver macromolecules during alcohol and tobacco users with help of different people blood samples [1]. Chronic and Excessive alcohol consumption are a global foremost healthcare problem. Heavy drinking alcohol consumption produces a wide spectrum of hepatic lesions, which is a more severe cause loss of function and deposition of fat in hepatocytes. This is lead to vascular alterations such as cirrhosis, and eventual liver failure [2,3]. One such putative accessory function is lipid metabolism, with macrophages in the lung and liver in particular being associated with this function [4]. Chewing could result in significantly greater deleterious cardiovascular effects due to larges over all exposure owing to prolonged absorption. Approximately 80 – 90 % of all lung cancer, oral cancer and 30 % of all cancer can beat tribute to the habit of tobacco chewing [5]. It has been estimated that every 378 – 500 cases of cancer which oral cavity and pharynx is associated with tobacco chewing.It is consumed much like chewing tobacco and like chewing tobacco it is considered responsible for oral cancer and other severe negative health effects. On average, tobacco increase heart rate 10 to 20 beats per minute and it increase blood pressure reading by 5 to 10 mmHg [6].

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Nicotine act as major roles such as elevates the blood levels of glucose and also inhibits the release of insulin from the pancreas, a hormone that is responsible for removing excess sugar from a person's blood [7]. Nicotine also tends to enhance platelet aggregation, which may lead to blood clots and also increases heart rate, constrict blood vessels and reduce circulation [8]. Nicotine can act like a stimulant or a sedative and causes the release of endorphins, which provide a tranquilizing effect finally, nicotine is considered more addictive than crack or alcohol [9]. Nicotine This is hyperglycemic condition, meaning he has more sugar in his blood than is normal. High blood sugar acts as an appetite suppressant, which may be why smokers think their cigarettes reduce hunger. Cholesterol is an important compound to play a vital role in the body [10]. It is synthesized by all the nucleated cell of the body and an integral component of cell in the cell membrane. Cholesterol and partly as free cholesterol in the blood and tissue. LDL is a cholesterol rich lipoprotein, distributing cholesterol to various tissues from liver. Another lipoprotein HDL originating as a nascent particle in the both liver and interesting contains about 50% protein in its molecule form. HDL is involved in scavenging of cholesterol from various tissues to liver, where they are excreted as bile acid and cholesterol through bile. Four classes of lipoproteins transport the lipid found in human blood during the fasting state are very low density lipoprotein (VLDL), intermediate density lipoprotein (IDL), low density lipoprotein (LDL) and high density lipoprotein (HDL). All these lipoprotein undertake far-reaching modification as they circulate [11,12,13]

Some people chew tobacco thinking it is less unhealthy than smoking but new research shows chewing tobacco and alcohol consumption appears to increase the risk of heart diseases [14,15]. Cardiovascular diseases (CVDs) are the number 1 cause of death globally, taking an estimated 17.9 million lives each year [16].

Nicotine replacement theory only deals with the physical part of withdrawal. These products work best when they are used with other quitting aids such as group sessions or counseling. They may reduce withdrawal symptoms and let you focus on dealing with the mental and emotional aspects of addiction. Tobacco users who are pregnant or have heart disease should talk to a doctor before using over-the-counter nicotine replacement. Currently available prescription medicines, like as bupropion and varenicline. Several types of carcinogen or chemicals that cause cancer are present in tobacco and hence it causes cancer of several organs. Since the same risk factors influenced the lipid profile and analyses the concentration of serum in tobacco chewers [17].

2. Methods

The study was carried to assess biochemical changes in the different age related group's samples were collected from MICRO LAB & GOVT. HOSPITAL at Arcot, Vellore district.

2.1 Preparation Of Serum

The freshly drawn blood obtained by mini puncture is placed directly into the centrifuge tube and allowed to clot for 30 minutes and centrifuged serum was separated.

2.2 Experimental Groups

Human subjects were divided into three groups, according to the experimental regimen as follows

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Group – I : Consists of human samples collected from normal subject's age between 25 – 40.
Group – II : Consists of human samples collected from patient's age between 25 – 40 .
Group – III : Consists of human samples collected from patient's age between 40 – 60 .

2.3 Biochemical Assay.
Serum blood glucose, triglyceride (TG), total cholesterol (TC), low density lipoprotein (LDL), Uric acid, high density lipoprotein (HDL), low density lipoprotein (LDL), very low density lipoprotein (VLDL) were determined by standard commercial methods on a parallel-multichannel analyser (SYNCHRON, Los Angeles, CA). and creatinine, determined by SYNCHRON CX System analyser [18].

3. Results And Discussion

Table I shows the case history of the subjects.

Table I- Case History Of The Subjects

S.NO	SUBJECTS	AGE	SEX		PERSONAL HABITS		FOOD HABITS	
			M	F	SMOKING	ALCOHOL	V	NV
1.	Group I	25 – 40	13	2	-	-	8	7
2.	Group II	25 – 40	15	-	2	7	-	15
3.	Group III	40 - 60	13	2	3	8	-	15

M – Male, F – Female, V – Vegetarian, NV – Non- Vegetarian

Human subjects were divided into three groups namely group I, group II and group III. The biochemical observations made in this study on different subjects were discussed in this section. Their smoking, drinking and food habits were depicted in table I. The group I subjects were all normal healthy subjects. 2 subjects out of 15 subjects of group I were females and 13 out of 15 were males. Out of 15 subjects 8 were vegetarian and 7 were non vegetarian. The group II subjects belong to the age group of 25 – 40, of which 15 were male and no one were female out of 15 subjects. In this group, 2 out of 15 were smoker and 7 were alcoholic 15 subjects were non-vegetarian and no one took vegetarian. The group III subject belongs to the age group 40-60, of which 2 were female and 13 of the 15 subjects were males. Only 3 of the 13 male subjects were smokers and 8 were alcoholic. 15 subjects were non-vegetarian and no one took vegetarian. Group II and III subjects, males were more than females.

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Table Ii shows the levels of serum fasting glucose, protein and urea in the 3 different groups.

The Level Of Glucose, Total Protein And Urea In The Normal And Tobacco Chewers

S.NO.	SUBJECTS	AGE	GLUCOSE mg/dg	TOTAL PROTEIN g/dl	UREA mg/dl
1.	Group I	25 – 40	77.6 ±6.1	6.8 ± 0.4	26.2 ± 5.7
2.	Group II	25 – 40	85.5 ±11.3*	5.4 ± 0.2*	32.4 ± 11.3*
3.	Group III	40 – 60	146.4 ±8.7*	4.6 ± 0.5*	49.8 ± 5.1*

Values are expressed as mean ± SD from 15 subjects in each group.
Statistical significance comparison of Group – I Vs Group – II and Group – III
*Significantly different from normal ($P < 0.05$).

Fasting glucose levels were significantly increased in group II and group III subjects when compared with group I. The higher level of blood glucose may be due to the tobacco chewers, reported that the usage of nicotine like products caused adverse effect like hyperglycemia in blood system [19] . Glucose is released into the blood while nicotine suppresses insulin output from the pancreas, because tobacco chewers have chronically elevated blood sugar levels. From the table it was clear that there was a significant decreased in total protein level in group II and group III subjects when compared to group I. The protein levels were decreased due to the severe infection. Nicotine affects adrenal hormone. A reliable marker for this response is increase peripheral cortisol. This inturn promotes catabolism of protein. As a result protein levels were decreased. The level of urea shows significant changes in group III then group II subjects. Increased rate of protein catabolism occurs after injury or infection owing to cytokine and counter regulatory hormone release. As a result a negative nitrogen balance is expected urinary nitrogen can be used as an indicator of the level of catabolic stress. As severity of stress increases protein catabolism becomes pronounced and excretion of urinary nitrogen and urine urea nitrogen increases [20.21].

Figure 1 gives the level of serum cholesterol, triglycerides and HDL in there experimental groups.

The cholesterol were significantly increased in group III than group II subjects when compared with group I. Increased synthesis of cholesterol in the body due to the very high amount of sugar and fat consumed. Because increased blood cholesterol there is tendency of atherosclerosis which is condition of thickening and narrowing of blood vessels like aorta, lungs, arteries etc [22]. The thickening is due to the deposition of

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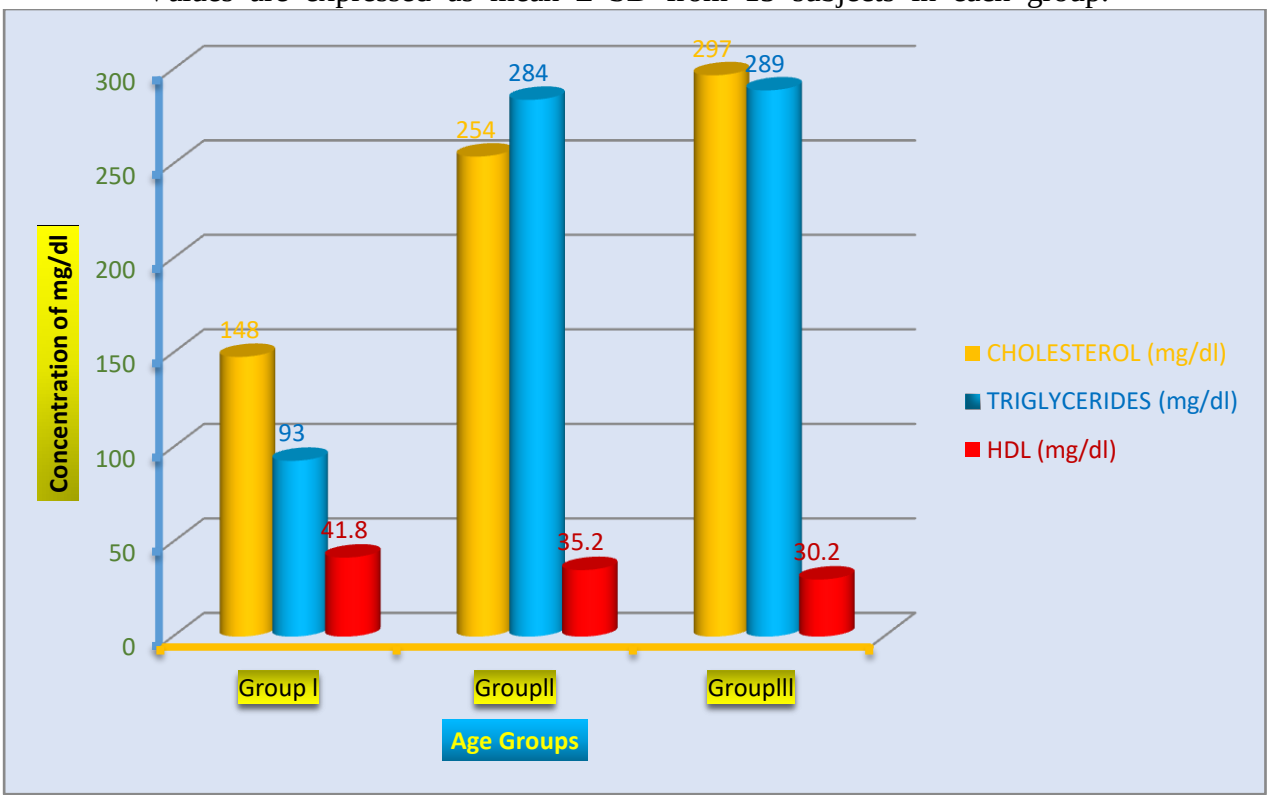
cholesterol and other lipids in inner wall of arteries. Sustained level of nicotine causing subsequent cardiovascular risk. Nicotine increases the risk of blood clots significantly. If blood clots in an artery, blood flow is reduced and tissue loses its source of oxygen and nutrients and dies in minutes. Increased triglycerides level were seen in tobacco chewers when compares with normal subjects. The higher levels of triglycerides in tobacco chewers may be attributed to tobacco induced stimulation on metabolism of free fatty acid in peripheral tissue [23].

Figure 1: The Level Of Cholesterol, Triglycerides And Hdl
In The Normal And Tobacco Chewers
Values are expressed as mean ± SD from 15 subjects in each group.



Statistical significance comparison of Group – I Vs Group – II and Group – III.
*Significantly different from normal ($P < 0.05$).
The HDL was slightly decreased group III than group II when compared with group I subjects. Levels of HDL slightly decreased were observed in tobacco chewers. It creates a significant risk factor. Animal studies have shown nicotine, a known tobacco carcinogen effect activity of enzymes responsible for lipid metabolism [24,25,26].

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Table IV Gives the level of LDL, VLDL and their ratio were discussed in there different experiment groups.

The Level Of Ldl, Vldl, Coronary Risk Ratio In The Normal And Tobacco Chewers

S.NO.	SUBJECTS	AGE	LDL mg/dl	VLDL mg/dl	RATIO
1.	Group I	25 – 40	87.5 ± 10	18.6 ± 2.3	3.5 ± 0.2
2.	Group II	25 – 40	157.2 ± 37.6*	53.5 ± 30.8*	6.2 ± 1.3*
3.	Group III	40 – 60	197.5 ± 32.4*	59.2 ± 14.8*	7.36 ± 1.2*

Values are expressed as mean ± SD from 15 subjects in each group. Statistical significance comparison of Group – I Vs Group – II and Group – III. *Significantly different from normal ($P < 0.05$).

LDL was slightly increased in the group II subjects when compared with group I and the levels of LDL were significantly elevated in group III. Seventy five percent of serum cholesterol is transported in the form of LDL. Body cells sequester cholesterol from LDL fraction of lipoprotein. Nicotine could cause elevation in cholesterol and it due to the release of fatty acid and glucose into the blood stream could prompt the liver into increased production and secretion of VLDL lipoprotein which is converted into LDL. Regulation of hepatic LDL receptors resulting in impaired clearance of LDL from blood and release of inflammatory cytokines that may contribute to the changes in the lipid profile [27,28,29].

Table V gives the level of serum uric acid and creatinine in three experimental groups.

The creatinine were significantly increased in group III than group II subjects when compared with group I increased level of creatinine may be due to muscle mass reduction in aging. The level of uric acid were increased in group II and group III when compared with group I.

The Level Of Creatinine And Uric Acid In The Normal And Tobacco Chewers

S.NO.	SUBJECTS	AGE	CREATININE (mg/dl)	URIC ACID(mg/dl)
1.	Group I	25 – 40	0.8 ± 0.2	4.1 ± 0.5
2.	Group II	25 – 40	1.2 ± 0.3*	6.4 ± 1.4*
3.	Group III	40 – 60	2.3 ± 0.7*	8.0 ± 1.3*

Statistical significance comparison of Group – I Vs Group – II and Group – III. *Significantly different from normal ($P < 0.05$). Values are expressed as mean ± SD from 15 subjects in each group.

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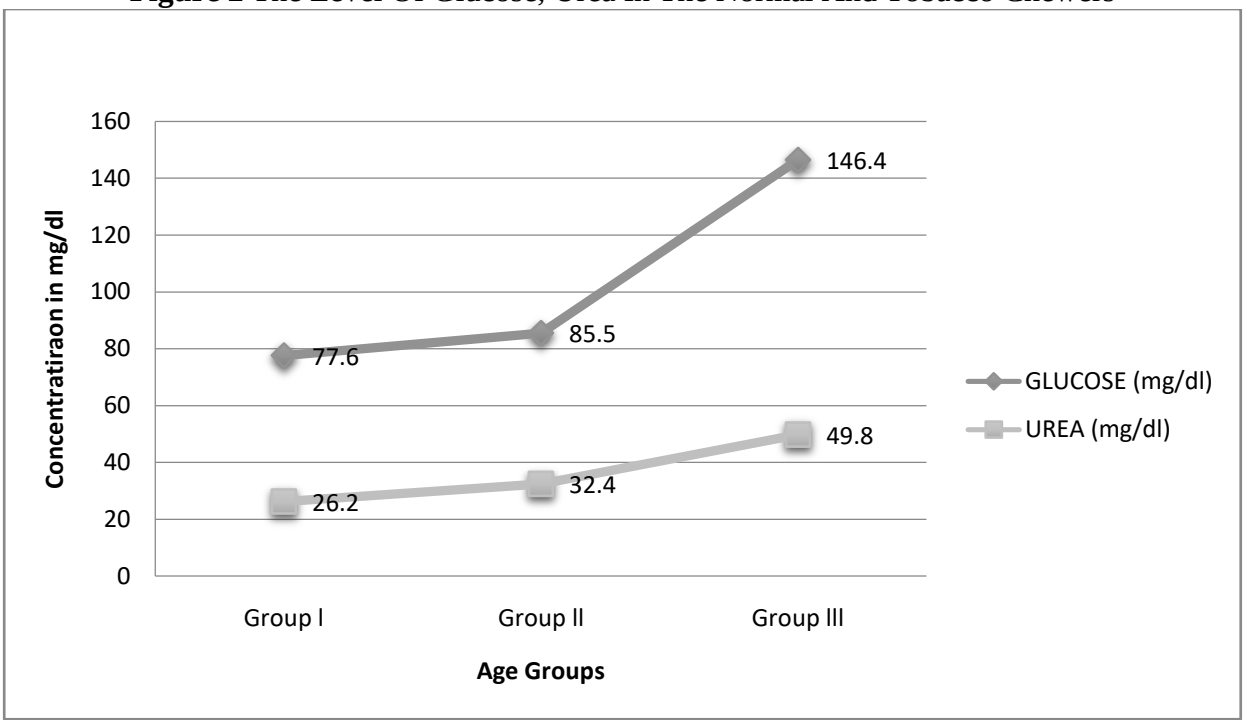
Increased level of uric acid may leads to hyperuricemia. Hyperuricemia may manifest as articular pain or swelling or it may be asymptomatic many factors. Impaired excretion of uric acid occurs in more than 75% of the subjects and excessive production of uric acid may be cause in 20 – 25 % of cases [30]. Hyperuricemia is not due to increased destruction of nucleic acid. The essential abnormality is increased formation of uric acid from simple carbon and nitrogen compound [31]. Tobacco chewing is highly prevalent in older generation of India. In India, it has been estimated that almost 80% of the older are addicted to this bad habit. Tobacco contains 26 carcinogens as its major constituents were all reported as major risk factors in the genesis of oral carcinoma.

Figure 2 The Level Of Glucose, Urea In The Normal And Tobacco Chewers



Values are expressed as mean ± SD from 15 subjects in each group.

The present study was estimated the levels of lipid profile in serum, blood glucose levels were significantly increased and may be due to hyperglycemia in blood system. Protein levels were moderately decreased, indicating rate of protein catabolism in tobacco chewers. Urea levels were increased due to increase rate of protein catabolism this inturn lead to increased excretion of urinary nitrogen. Level of creatinine are increased may be due to the reduction of muscle mass during aging. Elevated levels of uric acid were due to hyperuricemia. Cholesterol levels were significantly enhanced where as HDL cholesterol was significantly decreased in tobacco chewers. The increasing serum cholesterol may be due to increased LDL and VLDL.

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4. Statistical Analysis

All the experiments were conducted for number of samples indicated in the parenthesis and the values were expressed as mean ± SD. The modified students" test was used to compare the mean of these groups.

5. Conclusions

In conclusion, this study analyzed the expression profiles of liver markers of especially the lipid and glucose metabolism. That consumption of tobacco products are the world's leading preventable cause of death. Chewing tobacco could result in significance greater deleterious cardiovascular effects due to cholesterol, glucose, LDL and low HDL cholesterol in tobacco user as compared to tobacco non – user. Hence our aim to advise the tobacco chewers not to habituate or addict to chewing by explaining the harmful effect and protect them from various pathological diseases.

Conflict Of Interest

The authors declare no conflict of interest.

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