Relationship between Increased WBC with Increased Lipid Profile in Blood

* Buthaina Ateyah Rashid (Lecturer)

Abstract

Objective: leucocytes are cells of the immune system involved in defending the body against both infectious disease and foreign materials.
When increase or decrease in the number of leukocytes in the blood is often an indicator of disease(the normal level of WBC in blood between 4000 to 11000 cell /ml), , they make up approximately 1% of blood in a healthy adult.[3] An increasing in the number of leukocytes over the upper limits is called leukocytosis, and the decrease below the lower limit is called leukopenia.
Method: This research contained study 64 patients (average age between 20 – 35 years) suffering from increasing WBC " diagnostic by WBC count test "and perform lipid profile test (Triglyceride , cholesterol , LDL , HDL) for all patients and shows the changes in lipid profile
Results: we found relationship between increasing levels of lipid and increasing WBC disease. These result are (45 %cholesterol) (58%Triglyceride)(39% LDL)(22% HDL). That is mean, the increasing of lipid profile were stimulation of immune system to increasing the white blood cell.
We conclude than an increasing WBC associated with increasing of lipid profile
Key word: Relationship-WBC-Lipid profile

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* Collage of Health and Medical Technology/ Iraq.

Introduction

White blood cells, or leukocytes (also spelled "leucocytes", *leuco*- Ancient Greek "white"), are cells of the immune system involved in defending the body against both infectious disease and foreign materials. Five[1] different and diverse types of leukocytes exist, but they are all produced and derived from the multipotent cell in the bone marrow known as a hematopoietic stem cell. They live for about 3 to 4 days in the average human body. Leukocytes are found throughout the body, including the blood and lymphatic system.[2]

The number of leukocytes in the blood is often an indicator of disease. There are normally between 4×10^9 and 11×10^{10} white blood cells in a ml of blood, and ranging from 7 and 21 micrometres in diameter, they make up approximately 1% of blood in a healthy adult.[3] An increasing in the number of leukocytes over the upper limits is called leukocytosis, and a decrease below the lower limit is called leukopenia. The physical properties of leukocytes, such as volume, conductivity, and granularity, may change due to activation, the presence of immature cells, or the presence of malignant leukocytes in leukemia[1]

Cholesterol may differ depending on the lifestyle, gender or the heritage of the individual. Every one of us can do certain

things to live healthier, longer lives. One of those alternatives includes maintaining cholesterol at the right level. However, the truth is even young, thin, physically fit people can have high levels of cholesterol, even though chances of higher levels amplify due to certain factors. Lifestyle management can alter some of these factors while others require more aggressive approach to include cholesterol-lowering medication. Carrying around excess weight usually increases the level of "bad" cholesterol. One solution is to work frankly with your physician or a dietician to first determine what the perfect weight is for your frame and age, and then choose a sensible plan to the kinds of food that help to reduce your cholesterol.

Diet for cholesterol as affirmed at the beginning of this stage, avoiding foods made from saturated fats - coming from animals - is an essential line of defense in fighting high cholesterol. While buying cooking oils, look for unsaturated or vegetable fats. You must also use low fat cooking oils in place of heavy oils whenever possible. Regular daily exercise is an excellent way to lower cholesterol and maintain your body in the best functioning capacity. To have positive benefit, exercise 20 minutes of aerobic type exercise, which includes walking, done on a daily basis, gives you the need boost for lowering cholesterol. [2]

Cholesterol levels start increasing for both men and women as age goes up. Women normally have a lower level than men do between the age of 50 and 55. However, once a woman starts into menopause, the natural occurrence is that the cholesterol level starts to rise. The fact is that family genes play a big function in many aspects of a person's health to include the amount of cholesterol you may have to deal with. If you have a parent that has had to fight with high levels of cholesterol, your chances of following in their track is high. If your doctor has determined that you have a high level of cholesterol, do some researches to determine if other members of your family have this problem and ask what medications or therapies they have had success with. More than possible, that same method will help you. When you meet with your doctor or dietician, take your family history along with any proven medications and/or therapies for them to analysis. [3,2]

Symptoms of high cholesterol usually are unusual. High cholesterol levels are normally identified from a blood test. The symptoms seen are truly from the end-result of high cholesterol for health issues such as coronary disease, stroke, and peripheral vascular disease. Due to high level of cholesterol the primary symptom associated with coronary heart disease is called Angina (chest pain). When a person experiences this, they describe a feeling of "pressure", "squeezing". In addition to the reported pressure, other symptoms are nausea, shortness of breath, sweating, lightheadedness or dizziness, and heart palpitations. Angina can be directly correlated to coronary heart disease and must be taken seriously. :[4]

However, there are other stressors such as over-exertion, high-level of emotion, or even after eating a huge meal to be considered. In these circumstances a short period of rest, five minutes or so, will reduce or eliminate the symptoms. Again, if you have any of these symptoms, it is better to be checked out by a physician than to assume everything is fine. High cholesterol is a risk factor. Doctors consider cholesterol levels of no more than 180 to be optimal. :[5]

A low cholesterol level, however, is not a guarantee of good heart health, as some people with low levels do suffer from heart attacks. Reducing the quantity of saturated fat and cholesterol in your diet helps lower your blood cholesterol level. Taking proper

treatment for cholesterol is good for our health. The major purpose of cholesterol-lowering treatment is to lower your LDL level enough to reduce your risk of developing heart disease or having a heart attack. [6]

Triglycerides are formed from a single molecule of glycerol, combined with three fatty acids on each of the OH groups, and make up most of fats digested by humans. Ester bonds form between each fatty acid and the glycerol molecule. This is where the enzyme pancreatic lipase acts, hydrolysing the bond and 'releasing' the fatty acid. In triglyceride form, lipids cannot be absorbed by the duodenum. Fatty acids, monoglycerides (one glycerol, one fatty acid) and some diglycerides are absorbed by the duodenum, once the triglycerides have been broken down. [7,2]

A chain lengths of the fatty acids in naturally occurring triglycerides can be of varying lengths but 16, 18 and 20 carbons are the most common. Natural fatty acids found in plants and animals are typically composed only of even numbers of carbon atoms due to the way they are bio-synthesised from acetyl CoA. Bacteria, however, possess the ability to synthesise odd- and branched-chain fatty acids. Consequently, ruminant animal fat contains odd numbered fatty acids, such as 15, due to the action of bacteria in the rumen. [8,7,9,10]

Most natural fats contain a complex mixture of individual triglycerides; as result of this, they melt over a broad range of temperatures. Cocoa butter is unusual in that. It is composed of only a few triglycerides, one of which contains palmitic, oleic and stearic acids in that order. This gives rise to a fairly sharp melting point, causing chocolate to melt in the mouth without feeling greasy. [7]

Triglycerides, as major components of very low density lipoprotein (VLDL) and chylomicrons, play an important role in metabolism as energy sources and transporters of dietary fat. They contain more than twice as much energy (9 kcal/g) as carbohydrates and proteins. In the intestine, triglycerides are split into glycerol and fatty acids (this process is called lipolysis) (with the help of lipases and bile secretions), which are then moved into the cells lining the intestines (absorptive enterocytes). [11] The triglycerides are rebuilt in the enterocytes from their fragments and packaged together with cholesterol and proteins to form chylomicrons. These are excreted from the cells and collected by the lymph system and transported to the large vessels near the heart before being mixed into the blood. Various tissues can capture the chylomicrons, releasing the triglycerides to be used as a source of energy. [7] [12] Fat and liver cells can synthesize and store triglycerides. When the body requires fatty acids as an energy source, the hormone glucagon signals the breakdown of the triglycerides by hormone-sensitive lipase to release free fatty acids. As the brain cannot utilize fatty acids as an energy source (unless converted to a ketone), the glycerol component of triglycerides can be converted into glucose, via gluconeogenesis, for brain fuel when it is broken down. Fat cells may also be broken down for that reason, if the brain's needs ever outweigh the body's. [13]

Triglycerides cannot pass through cell membranes freely. A special enzymes on the walls of blood vessels called lipoprotein lipases must break down triglycerides into fatty acids and glycerol. Fatty acids can then be taken up by cells via the fatty acid transporter (FAT). [14]

Role in disease

In the human body, high levels of triglycerides in the bloodstream have been linked to atherosclerosis, and, by extension, the risk of heart disease and stroke. However,

the relative negative impact of raised levels of triglycerides compared to that of LDL:HDL ratios is as yet unknown. The risk can be partly accounted for by a strong inverse relationship between triglyceride level and HDL-cholesterol level.

Guidelines

The American Heart Association has set guidelines for triglyceride levels:[2]

Interpretation	Level mg/dL	Level mmol/L
Normal range, low risk	<150	<1.69
Borderline high	150-199	1.70-2.25
High	200-499	2.26-5.65
Very high: high risk	>500	>5.65

Please note that this information is relevant to triglyceride levels as tested after fasting 8 to 12 hours. Triglyceride levels remain temporarily higher for a period of time after eating.

Material and Method

samples (serum) were collected from patients " increased WBC " we conduct on the serum sample following test

1- cholesterol
2- triglyceride
3- LDL
4- HDL

Type of Kit ((RANDOX 321N)) were using in this research

Procedure cholesterol test :

1- add 1 ml from reagent one
2- add 10 m from sample or stander . with mixing .
3- read on 510 nm
4- application the following formula :

$$\text{urea concentration} = \frac{\text{Absorption test}}{\text{Absorption stander}} \times \text{stander concentration (200)}$$

Normal Value : 150 – 250 mg/dl

Procedure Triglyceride test :

5- add 1 ml from reagent one
6- add 10 m from sample or stander . with mixing .
7- read on 510 nm
8- application the following formula :

$$\text{urea concentration} = \frac{\text{Absorption test}}{\text{Absorption stander}} \times \text{stander concentration(150)}$$

Normal Value : 60 – 150 mg/dl

Procedure HDL test :

1-add 1 ml from reagent one
2-add 10 m from sample or stander . with mixing .
3-add 0.2 ml from reagent two
4-read on 510 nm
5-application the following formula :

$$\text{urea concentration} = \frac{\text{Absorption test}}{\text{Absorption stander}} \times \text{stander concentration}$$

Normal Value : 40 – 180 mg/dl

LDL = Cholesterol – (Tri./5+HDL)

Results:

Table (1): show Increase level of Lipid profile with increased WBC.

Test	Total		Normal Lipid profile		Increase Lipid profile	
	%	No.	%WBC	No.	%WBC	No.
cholesterol	100	64	55	35	45	29
Triglyceride			48	27	58	37
LDL			52	33	48	31
HDL			82	52	18	12

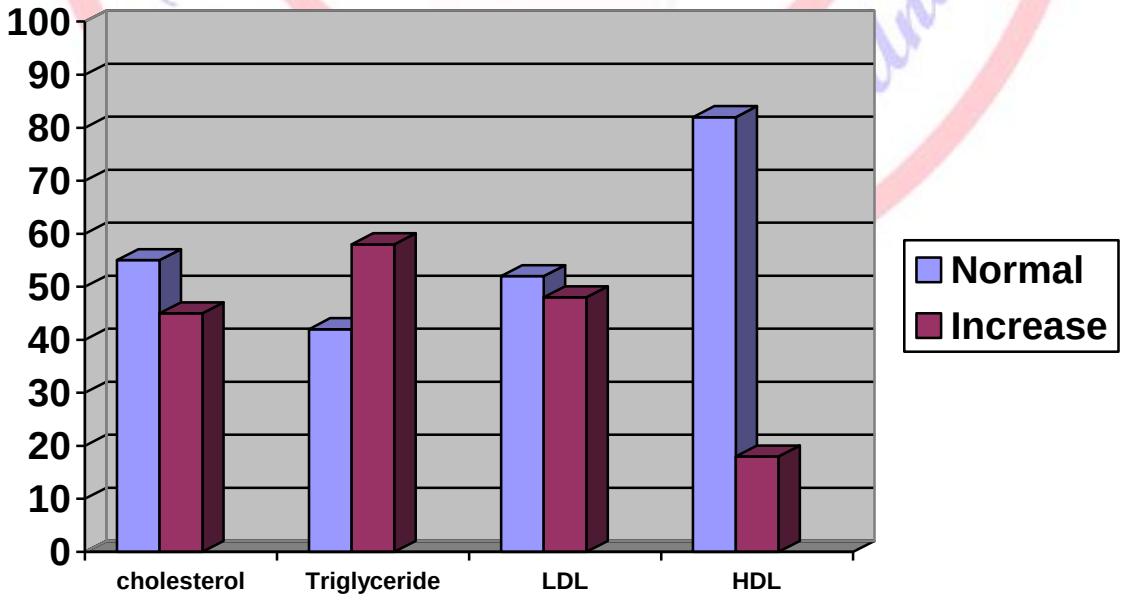

Figure (1) : Increase level of Lipid profile with increased WBC patients.

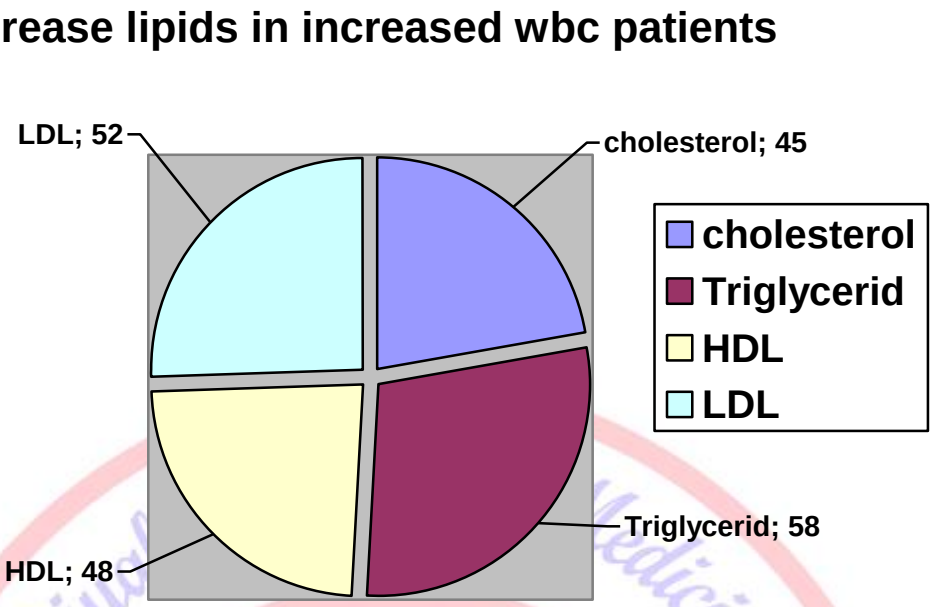

Figure (2): shows the serum level ofsub groups of lipid cholesterol Triglyceride LDL HDL.

Table (2): Increase Rate of Lipid profile in male and female patients :

Test	Total	Female	Male
	%	%	%
cholesterol	100	44	56
Triglyceride		69	31
LDL		45	55
HDL		67	33

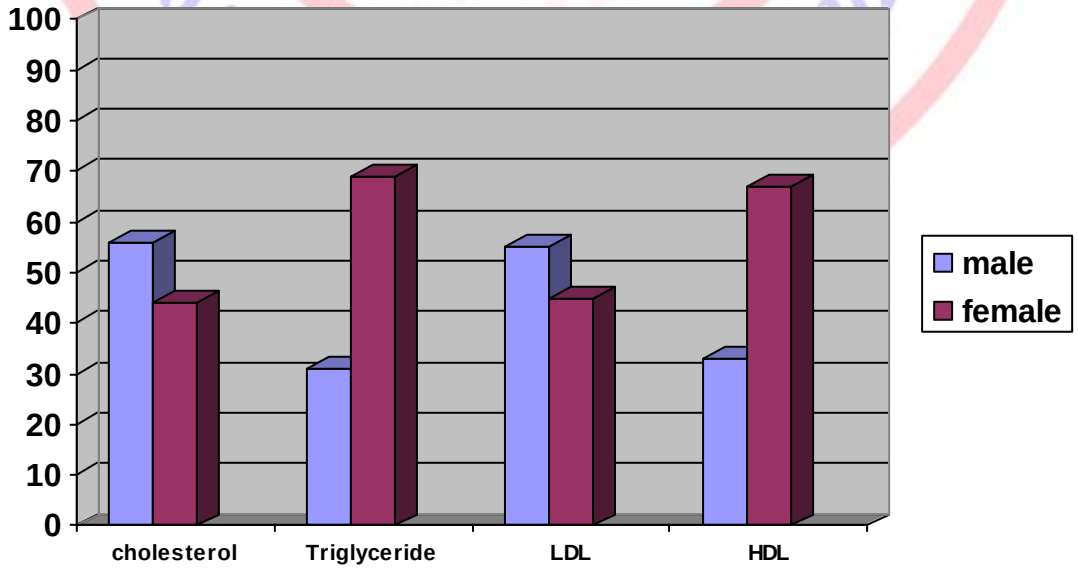

Figure (3): Increase Rate of Lipid profile in male and female patients.

Discussion

This research contained the studying of 64 patients (average age between 20 – 35 years) suffering from increasing WBC " diagnostic by WBC count test "and perform lipid profile test (Triglyceride , cholesterol , LDL , HDL) in table(1) and figure (1) shows that Increased WBC count with increased of triglyceride concentration only due to the triglyceride stimulation of immune system to produce more white blood cells because the triglyceride energy supply to immune system ,while , cholesterol , LDL , HDL were stopped of production of white blood cell due to effect on it (specific receptor) and suppressing of production new white blood cell, in this research appearance of results (Table 1) increase of total lipid (cholesterol concentration) to 45% comparing to health man , and appearance increase triglyceride to 58 %, therefore triglyceride more the lipid types increase in Increased WBC count patients , so LDL "low density lipid" were increase to 48% while HDL "high density lipid" were few increase because of higher of LDL concentration .

In this study conclusion to the patients to decreased of level of lipid profile (Triglyceride, cholesterol, LDL, HDL) to stimulation of immune system against any infection (virus ,bacteria , parasite and any inflammation) and advance them to eat healthy food were content omega 3 that is decreased of level of lipid profile.

In table(2)and figure (3) show that cholesterol and LDL concentration were increased in male more than female , while , Triglyceride and HDL concentration were increased in female more than male , this different between male and female in lipid profile depended on different of hormones between male and female and that affective on level of immune system in human body .

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