

Determination of Lipid Profile, Atherogenic Index and Number of Biochemical Parameters in Infertile Men

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ABSTRACT:

The current study aimed to determine the level of lipid profile levels (Cholesterol, Triglycerides, High-Density Cholesterol Lipoproteins, Low-Density Cholesterol Lipoproteins, atherogenic index, Body Mass Index and liver enzymes (AST, ALT) in a number of infertile males in the Samarra city .

. This study was conducted in Samarra city from January 2019 to May on two groups included (25) diagnosed male with infertility, who were considered as study group (patients) and (10) healthy males considered as control group. The results showed a significant increase at ($p \leq 0.05$) levels of Cholesterol, TG, LDL-C, VLDL-C, AST, ALT, AI and BMI in the patient group compared to the control group. While HDL-C showed a significant decrease in the patients group compared to the control group.

Key words: Infertility, Lipid profile, ALT, AST

INTRODUCTION:

Infertility is defined as inability to conceive after at least one year of aregular sexual intercourse and without the use of contraceptives, and occurs by (10-15%) between married couples and almost (15-20%) Of the cases are due to males while females are the cause of (50%) Almost from cases clinically valuable tests in the analysis of semen include the calculation of sperm count per milliliter, sperm motility movement, and morphology (1).

The most important steps in the diagnosis of infertility in men is take the medical history and physical examination (2), Taking the patient's previous medical history is very important because it will contribute to the treatment of about a quarter of of infertility cases (3).

Some childhood diseases may lead to disorders in reproductive system, such as testicular failure, which leads to the disappearance of the testicles, while post-puberty diseases include mumps and testicular inflammation (2).

Physical examination is second step in diagnosing abnormalities that cause infertility, measuring height, weight and blood pressure gives some information about systemic diseases, and the distribution of hair in the body gives an indication of the production of androgens (3).

The causes of infertility in men vary between the difficulty of ejaculation or the difficulty of sexual intercourse with immune causes related to the presence of sperm antibodies in semen (4), therapeutic causes like abnormal sperm as a result of medical or surgical interference or due to the use of certain medications (3), congenital malformations that include disappearance of the testicles and loss of sperm (5), hormonal disorders and other causes.

Mahmoud *et al.*, (6), Nguyen *et al.*, (7) indicated that the body mass index is a dangerous indicator of male fertility, affecting and reducing sperm count.

METHODS:

Study samples: The study included 25 infertile males aged 18-45 years after their condition was confirmed through clinical medical examinations by competent doctors, as well as the selection of a random group consisting of 10 healthy males with the same age groups of patients.

BIOCHEMICAL ASSAY:

Lipid profile (Cholesterol, Triglycerides, High Density Lipoprotein- Cholesterol (HDL-C)) was quantified by followed the given procedure with kit (biolabo, France), Low Density Lipoprotein- Cholesterol (LDL-C) estimated by the equation :

$$LDL-C = Chol - HDL-C - VLDL-C$$

Very Low Density Lipoprotein- Cholesterol (VLDL-C) estimation by the following equation (8):

$$VLDL-C = TG/5$$

The efficacy of ALT and AST enzymes was estimated by followed the given procedure with kits (biolabo, France)

Atherogenic Index (AI): Atherogenic Index estimate by the following equation (9):

$$AI = TC / HDL-C$$

Body measurement:

male length of the study sample was measured using the cm unit height scale (and body weight were set using the scale per kilogram), and the BMI was calculated by dividing the weight in kilograms by the length square in meters (7) .

STATISTICAL ANALYSIS:

Results were analyzed statistically by using Analysis of Variance Test-ANOVA by using the statistical program Minitab. Averages were compared to calculations of the characteristics of the application by probability level $P \leq 0.05$.

RESULTS AND DISCUSSION:

The results of study Table (1) showed a significant increase in BMI in patients group compared to control, as high BMI and obesity is associated with different changes in the production of

hormones, especially testosterone, insulin and the effectiveness of metabolism, and researchers pointed there is association between obesity and insulin resistance, in addition to that obesity is associated with the relative resistance of gonads hormones (10).

Table (1): BMI in patients and control.

	BMI
patients	29.915 ± 2.637 a
Control	23.948 ± 1.582 b

* different letters refers to significant differences $P \leq 0.05$.

Also Results in Table (2) Showed A significant increase in TC and TG LDL-C, VLDL-C and AI in patients, and triglycerides were found to have a bad effect on sperm associated with reduced sperm motility and testosterone hormone in infertile men (11), studies have also shown that hypercholesterolemia has a damaged effect on testis tissues and functions including sperm, steroid production, sperm maturation and fertility index (12; 13)

Table (2): Lipid profile and atherogenic index in patients and control.

	AI	TC	TG	HDL-C	LDL-C	VLDL-C
patients	3.76 ± 0.76 A	194.20 ±14.62 a	161.85 ±12.76 a	49.240 ±1.702 b	110.21 ±14.77 a	32.370 ±2.552 a
Control	3.16 ± 0.89 B	155.75 ± 1.30 b	138.25 ±4.09 b	51.620 ±1.752 a	74.33 ±7.16 b	29.040 ±3.214 B

* different letters refers to significant differences $P \leq 0.05$.

Dietary TC cholesterol has been found to inhibit the production of steroids and thus decrease the testosterone hormone (14). High triglycerides may be due to the activation of fatty decomposition process edited by hyperinsulinemia and this is associated with a serial increase in non-esterized fatty acids due to increased TG and lower HDL-C (15).

The increase in atherogenic index is an indicator of the incidence of organs supply of blood in the arteries, which leads to the undersupply of organs with blood and the development of coronary artery disease (CAD) and stroke, which are characterized by high cholesterol concentration (16), and several studies have pointed to the role of Reactive Oxygen Species (ROS), including free radicals in the mechanisms of the occurrence of atherosclerosis, This is due to oxidative stress resulting in an increase in effective oxygen conditions associated with reduced antioxidant susceptibility in the body (17).

The most important factors contributing to increasing of atherogenic index are high blood pressure, smoking, high concentration of cholesterol and obesity, also the increase in the level of atherogenic index is due to increased release of adrenaline and noradrenaline, which activate the

lipase enzyme, which in turn causes the decomposition of triglycerides and the release of fatty acids (18).

LDL-C and VLDL-C increasing may be due to increased oxidative stress in the body, reducing the effectiveness of a different enzyme body tissue and this decrease leads to impaired lipid levels and high levels of TG and VLDL-C (19).

Table (3) showed a significant increase in the efficacy of AST and ALT in infertile males compared to control, a study indicated the association of BMI with the concentration of the enzyme ALT (20). The most common indicators of liver damage or toxicity are ALT and AST enzymes, and when the liver is damaged for whatever reason, these enzymes increase very rapidly (21).

Studies have also indicated a close association between obesity and non-alcoholic liver cirrhosis (22), and level of testosterone hormone was found to be associated with increased obesity, metabolic syndrome and insulin resistance (23).

AST and ALT increased indicates the degree of chronic liver disease, particularly non-alcoholic fatty liver disease (NAFLD) (24). Non-alcoholic fatty liver disease is characterized by increased lipid accumulation in the kidney after alcohol consumption (25).

A clinical study indicated that men with NAFLD have low levels of testosterone (26), in addition to a disorder in the concentration and movement of sperm and number associated with NAFLD (27), and the proposed mechanisms linking NAFLD with sperm disorders are most likely responsible for the effect on the level of the hormone.

Table (3): AST and ALT activity in patients and control

	AST	ALT
patients	29.000 ± 3.534	16.000 ± 3.964
	A	a
Control	9.284 ± 2.170	13.000 ± 1.732
	B	b

* different letters refers to significant differences $P \leq 0.05$.

CONCLUSION:

We conclude from the results of this study that the BMI is influenced by lipid levels and both affect fertility level and metabolic functions in the body and affect liver enzyme levels. It is also clear that the infertility of men in this study is caused by metabolic disorders that can affect levels of sex hormones

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