

# Effect of Warfarin on cholesterol, LDL, HDL and TG levels in coronary artery patients

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## Abstract:

The increased levels of cholesterol, LDL, TG and the low of HDL ratio in plasma blood lead to coronary artery disease which occurs due to lack of exercise, eat fatty foods, smoking, diet, depression and other factors, the study included 40 people as control group and 80 people of coronary artery patients, a device mindray BS-120 was used in the analysis of the samples, the outcomes of this research showed that the ratio of cholesterol, LDL, TG and HDL was approximately adjusted to normal rates by take warfarin therapy which acts as an enzyme inhibitor called Vitamin K epoxide reductase which leads to the lack of fibrin (blood clot) And so on Improve the functioning of blood circulation so best lipid metabolism.

**Keywords:** warfarin, cholesterol, LDL, HDL, TG.

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## INTRODUCTION

Cardiovascular disease (CVD) is a Category of diseases involving vessels of the heart or blood (arteries and veins). (CVD) includes, stroke, rheumatic heart disease, heart failure, hypertensive heart disease, cardiomyopathy, heart arrhythmia, valvular heart disease, carditis, aortic aneurysms, congenital heart disease, peripheral artery disease and thromboembolic disease, as well as coronary artery diseases.

Coronary artery diseases (CAD) such as angina and myocardial infarction (commonly known as a heart attack), this may be caused by high blood pressure, diabetes, lack of exercise, smoking, obesity, high blood cholesterol, excess alcohol consumption and poor diet, where it causes impaired oxygen access to the heart muscle, chest pain and abnormal heart beat are common symptoms.

Cholesterol is a fatty organic compound of the steroid class. It is of great vital importance as it enters the structure of cells that are mainly coated with cells, so cells manufacture it if the body does not get it from an external source. Cholesterol is also a major source of other body steroids such as sex hormones and vitamin (D) and bile acids, There is a close relationship between the rise of cholesterol in the blood and the occurrence of atherosclerosis, where cholesterol is precipitated with some other fat on the wall of the coronary arteries feeding the heart muscle, which leads in severe cases, including myocardial infarction.

High Density Lipoproteins (HDL) is a derivative of lipoproteins, it carries cholesterol from the blood to the liver where it is metabolized and extracted from the bile. This means that an increase in HDL in the blood leads to a decrease in the level of cholesterol in the blood, which prevents atherosclerosis, which is sometimes called good or benign cholesterol.

Low Density Lipoproteins (LDL) is a fatty protein and is also called lipoproteins, which is responsible for carrying cholesterol in the blood, which contains 50 - 75% of it, so the increase in the level of LDL leads to an increase in the incidence of atherosclerosis, so some call it bad cholesterol or malignant.

Triglycerides (TG) are organic compounds that are exposed to building and destruction, and combustion of these compounds provides the body with a large card used by the body when carbohydrate deficiency [1,2,3]

Warfarin is an anti-coagulation therapy used in deep vein and pulmonary embolism to prevent stroke in people with atrial

fibrillation and heart valve disease works to prevent blood clotting by blocking an enzyme that activates vitamin K<sub>1</sub> [4,5]

Previous studies have been conducted on the use of warfarin for cardiovascular patients, *In 2017 Numa, Yoshimi, et al.* where predictors of ratio variability of international normalized in atrial fibrillation patients who use Warfarin drug [6]

*In October 2017, Barnes, Geoffrey D., et al.* found the importance of periodic monitoring of the proportion on which the basis of this ratio is to determine the necessary dose of this treatment to avoid bleeding. [7]

*In 2017 Jun, Min, et al.* studied warfarin initiation, and kidney function to atrial fibrillation older adults patient who were newly injured, their research has shown that warfarin therapy does not risk bleeding except for those with glomerular filtration rate of 60 to 89 ml/min/1.73 m<sup>2</sup> [8]. Studied the effectiveness of warfarin in the treatment bioprosthetic valve thrombosis *by Egbe, Alexander C., et al (2017)*, the study showed the success of anticoagulation in 83% of patients. The response period was 3 months and was considered bioprosthetic valve thrombosis a predictive outcome of treatment response [9].

*Also, Hashikata, Takehiro, et al. (2017)*, They concluded that the effectiveness of warfarin therapy in patients with thrombosis, especially patients taking statins. [10].

## MATERIALS AND METHODS

This essay was completed at about 3 years, from January 2014 – March 2017 in Najaf city (Al-Sadar hospital), the study was conducted on two groups of volunteers, the first group included 80 people with cardiovascular disease, average age 48.5 and the other 40 healthy people as control group, average age 45, blood samples were collected from subjects after fasting for 9 to 12 hours.

The method includes two steps taking of blood samples from subjects, transferred it to test tube then in water bath for 10 - 20 min at 25 °C for clotting completing, separation the serum by use centrifuge for 10 min. and finally put it into mindray BS-120 device [11]

## Statistical Analysis

Data analysis was carried out using SPSS V.21 and showed as arithmetic mean ± S.D., with subsequent use of student t-test, p.value < 0.05 was considered as significant.



Fig (1) : Mindray Auto Analyzer apparatus



Fig (2) : Mindray Auto Analyzer apparatus when placing samples

**RESULTS AND DISCUSSION**

The work demonstrated after take warfarin drug cholesterol and LDL levels significantly decreased ( $p < 0.05$ ) lower than their initial levels while significantly increase ( $p < 0.05$ ) HDL levels higher than their initial levels , It was noted that cholesterol ,LDL rates improve well compared to rates of TG where rates decrease after treatment, but stay slightly above normal rates outcomes as shown in fig. (3) , (4) (5) and (6) .

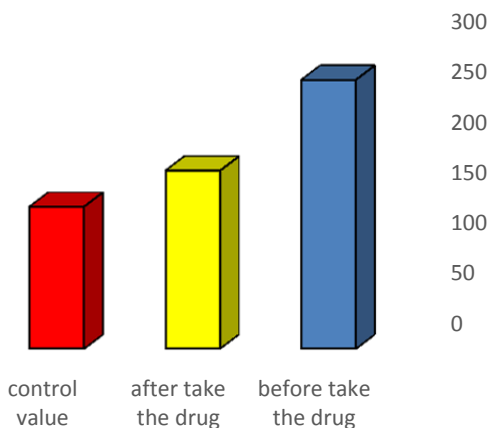


Fig. ( 3 ): average of cholesterol conc.(mg/dl) before and after take warfarin therapy and control value

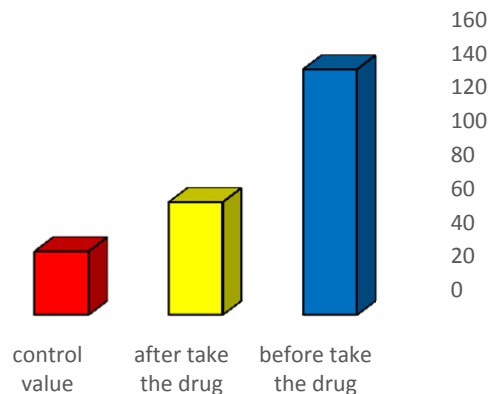


Fig. ( 4 ): average of LDL conc.(mg/dl) before and after take warfarin therapy and control value

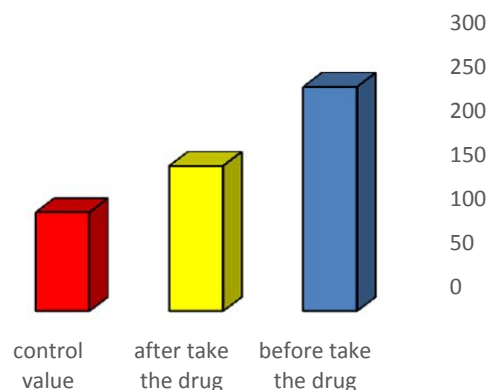


Fig. ( 5 ): average of TG conc.(mg/dl) before and after take warfarin therapy and control value

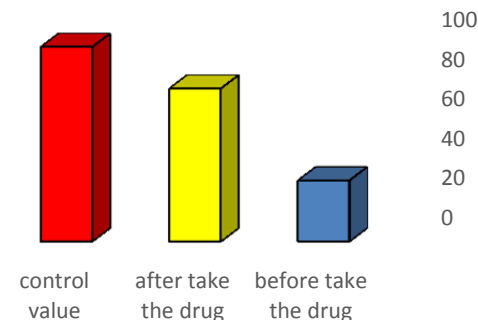


Fig. ( 6 ): average of HDL conc.(mg/dl) before and after take warfarin therapy and control value

These results can be attributed to the role of warfarin therapy inhibition blood clotting by inhibiting an enzyme called reduction of vitamin K. Thus, the formation of prothrombin, which works with calcium ions and thromboplastin to generate thrombin enzyme ,which extracts some peptides of the fibrinogen molecule that can polymerize itself into an insoluble protein called fibrin (blood clot),[12] that leads to improved blood circulation and thus adjusted the rates of cholesterol ,LDL,TG and HDL to normal rates, as is the case when exercising , which is partly responsible for increasing the production of several enzymes that enhance the reverse cholesterol transport system and cleared from the blood ,[13]

**CONCLUSION**

- 1- The treatment of warfarin has an effect on the adjustment of cholesterol levels compared to normal rates.
- 2- Noted that levels of cholesterol ,LDL are decreasing well compared to rates of TG where rates decrease after treatment, but stay slightly higher than normal rates .
- 3- Taking doses of this treatment over time should be under control and measured international normalized ratio and prothrombin ratio continuously so that the risk of bleeding does not occur .

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