

A Study on Cholesterol, Triglyceride, and
Total Lipid in 100 Patients Suffering from
Myocardial Infarction

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INTRODUCTION:

One of the factors always considered as creating grounds for myocardial infarction, in high level of blood lipid, sometimes mentioned as most effective factor in producing infarction. To prove the connection between the above two (i.e. myocardial infarction and blood lipid), I decided to take blood samples for examination, immediately after the attack, and repeatedly, even for sometimes, after the attack.

METHODS AND MATERIALS:

A study was made on 100 patients hospitalized in Cardiovascular Departments of various Tehran hospitals, whose myocardial infarctions were diagnosed as positive. Efforts were made to take venous blood samples, as soon as the diagnosis was finalized, in order to measure the level of serum cholesterol, triglyceride and total lipid.

Generally accepted values for normal total serum lipids are 450-1000 mg/100 ml. There is evidence that total lipids increase with age.

The particulars of patients were noted as far as

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Measuring serum levels of triglycerides is based upon the methods of Kessler and Lederer (1), and Fletcher (2). Following table shows normal range of triglycerides, depending on the age of the patients concerned.

Suggested Normal Ranges for Serum Triglycerides

Age (yr)	Serum Triglyceride concentration (mg/100 ml.)
0 - 19	10 - 140
20 - 29	10 - 140
30 - 39	10 - 150
40 - 49	10 - 160
50 - 59	10 - 190

For serum cholesterol determine, Zlatkis, Zak & Boyle (3) method was carried out, while making use of the reaction between ferric chloride and sulfuric acid. By taking into consideration the age, sex, diet, geographical situation and other factors, its normal range may be 130-250 miligram in 100 cubic centimeters of serum plus or minus 20 miligram.

Total lipid test was performed by sulfophosphovanillin method. This method was published by Charonnat and Chabrol (4,5) and reinvestigated by Kirsch and Zoeliner (6). Serum lipids containing double bonds are hydrolyzed by heating with concentrated sulfuric acid, a portion of this heated acid serum solution is added to the phosphovanillin reagent to produce a color complex, proportional to the amount of total serum lipid present.

possible and were tabulated. These particulars are : name, surname, age, sex, the date the patients referred first to the hospital, and the date on which they were discharged or deceased; marital status, addiction, occupation as well as inherited diseases, and diseases they suffered from in childhood.

Table No.1
According to sex and
type of addiction:

Type of addiction	Total No.of patients	Women	Men
	100	34	66
Cigarette	71	13	58
Alcoholic beverages	6	-	6
Opium	5	1	4
Pipe	1	-	1

Out of 100 patients studied in this survey, 66 patients were men, 34 women, the age of 77 patients was found to be over 50, while 23 patients were between 38 to 48 years of age.

RESULTS :

Out of 100 patients studied by us, 34 patients were found to have over 250 mg. of cholesterol (normal 130-250 mg/100 mg. serum).

The result of triglyceride determination on 21 patients was over 190 mg. (normal 10-190 mg/100 ml.) Also the

result of total lipid determination in one patient, was over 1000 mg. (normal 450-1000 mg/100 ml.)

The following table shows the result of tests and its relation to the sex of patients:

Table No.2

Tests	Total No.of patients	Women	Men
Patients studied in this survey	100	34	66
Abnormal cholesterol	34	10	24
Abnormal triglyceride	21	6	15
Abnormal total lipid	1	-	1

As noticed in the above table, the number of myocardial infarction in women is fewer than in men; i.e. the percentage of women is only 34, which is almost one third of the total number of patients under study; while the number of men is 66 or else, two third of the total number of patients.

In the meanwhile the patients were studied from the standpoint of addiction, in order to find out whether there is any connection between myocardial infarction and addiction. The exact result has been shown in table No. 1 from which we can gather that : out of 100 patients of both sexes, 71 were cigarette smokers, one pipe smoker and 5 opium addicts, while 6 were alcoholics.

However the main object of this essay which can be seen in Table No.2, is that : in general 56% of patients

had abnormal lipid (16% women and the remaining 44% men.)

DISCUSSION :

A number of different compounds ingested or synthesized by the body are loosely classified as lipids. In connection with the study on myocardial infarction related to lipids and trigly glyceh cerides one has to be familierized with the following. These compounds share certain physical properties, such as their mutual solubility, their solubility in fat solvents and their insolubility in anaqueous medium.

A lipid can be defined also as a polar-nonpolar substance in which the nonpolar parts are predomenant. (6)

Total serum lipids include triglycerides, phospholipids, cholesterol and its esters, nonesterified fatty acids, glycolipids (urebrosides), acetal phosphatides (Plasmogens), phosphatic acids, higher alcohols, carotenoids, steroid ketones and vitamins A, D, and E. (7)

Body lipids are derived from fats in food by digestion, intestinal absorbtion and chemical modification and are also bio-synthesized from carbohydrates and proteins.

In blood, lipids are combined with proteins as lipoproteins.

These are water-soluble and serve to transport the water-insoluble lipids, fatty acids, triglycerides, phospholipids and cholesterol.

The lipide fulfill a variety of major functions:

Triglycerides and fatty acids represent the body's major reserve of chemical energy. Triglycerides-the main constituents of adipose tissue-provide 9.3 calories/gram, as compared with 4 calories/gram for carbohydrates

and proteins.

Phospholipids and cholesterol are the most abundant lipids in the structural units of cell membranes and membranes of cellular organelles.

Lipids serve to insulate the body: they protect against mechanical shock, preserve body heat and facilitate transport of electrons along nerve trunks.

In order to evaluate the abnormal changes in lipid metabolism which occur in certain diseases, and which often have diagnostic significance, a brief review of normal lipid metabolism is presented. (8,9)

The blood lipid determination must be done very carefully and precisely; and this is not possible in all laboratories. By different methods, therefore different results are obtained.

The normal range of blood lipids change according to age, and certain factors, such as nutrition, affect them. Some lipids increase two to ten hours after the food is taken. Hence this point must be taken into consideration during the process of blood level determination. Basically the amount of blood lipids depend upon metabolic changes and its level varies according to type of food, various diseases, drugs and the weight of the patient.

The important point related to this essay is that: immediately after the myocardial infarction and up to six weeks thereafter, a noticeable change is seen in the level of lipids. (10,11)

As yet there is no general agreement regarding the normal range of serum triglycerides. Fredrickson et al. (12) has proposed a range of 10-190 mg/100 ml. be used depending on age, assuming that the average American diet

provides 40% of its calories in the form of fat.

Copaland suggests that each laboratory determines its own normal range. Attention should be given to the fact that certain measurements are influenced in clinically healthy individuals, by diet, sex, age, diurnal variation, physical activity, menstrual cycle, pregnancy and environmental factors (13).

Total lipid increases with age. There is no sex difference except during pregnancy, when total lipids increase. At birth, levels are about 120-200 mgm%, and there is a two-fold increase within the first few days, with the adult level reaching after the age of one year. It is advisable that each laboratory should establish its own normals for its particular population(14).

SUMMARY :

100 patients suffering from myocardial infarction were tested in various hospitals, for cholesterol, triglyceride, and total lipid.

Methods for cholesterol, triglyceride and total lipid tests, as well as their normal ranges explained.

Specifications of patients were compiled as far as possible and in Table No. 1, a comparison has been given on the number of addicts, the type of addiction, as well as the sex of patients.

In Table No.2, the result of tests on 100 patients object of our study, are compared with each other and conclusion has been drawn. In the last part, a general discussion has been made on lipids.

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