A Cheap Method for Diagnosis of Cancer

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Summary

Major issue in the treatment of cancer is its early diagnosis. If cancer is diagnosed at earlier stage, it can easily be treated. Alteration in plasma lipid profile may also be used as marker for diagnosis of cancer.

Key Words: Plasma lipids, Cancer

Introduction

Major issue in the treatment of cancer is its early diagnosis. If cancer is diagnosed at earlier stage, it can easily be treated by medicines available, like chemotherapy. The current methods used for cancer diagnosis are costly and are not approachable by poor. So it was a need to search some new methods which must be easily approachable by common citizens. Estimation of plasma lipid profile is usually used for the diagnosis of heart diseases. It has been established that plasma lipid profile is changed in cancer patients. So the change in plasma lipid profile may also be used as marker for diagnosis of cancer. Most of the work in search of this relation between plasma lipids and cancer was done by MI Qadir *et al.*, [1-3] so the test may be named as Qadir's test for cancer.

Plasma Lipid Profile

Lipids are carried in body fluids with the help of lipoproteins, chylomicrons transport of triglycerides from the intestine to all cells.[4,5] Very low-density lipoproteins (VLDL) are involved in the transportation of triglycerides from the liver to other cells. Low-density lipoproteins (LDL) are responsible for the transport of cholesterol from liver to the cells and high density lipoproteins (HDL) are involved for the transport of cholesterol from cells to the liver. Chylomicrons and very low density lipoproteins are rapidly catabolized.[6,7] Thus triglycerides, cholesterol, LDL–cholesterol and HDL–cholesterol constitute Plasma Lipid Profile.

Relation of Plasma Lipids With Cancer

Several prospective and retrospective studies have shown an inverse association between blood lipids and different cancers.[8-14] Cholesterol and triglycerides have very very important physiological rule in cells. Cholesterol maintains functional as well as structural integrity of all biological membranes. It is also involved in the activity of membrane bound enzymes and is important for stabilization of the DNA helix.[15,16] Cellular uptake and regulation of cholesterol is mediated by lipoprotein receptors especially located on the surface of the cells. For transport in plasma, triglycerides and cholesterol are packaged into lipoproteins, which are then taken up and degraded by cells to fulfill demands for cellular functions. Low levels of plasma lipids could be due to the process of carcinogenesis. As during carcinogenesis more cells are proliferating, more plasma lipids are utilized for their synthesis. Thus lower levels of plasma lipids may be used as indicator of cancer.

Estimation of Plasma Lipid Profile

Plasma levels of triglycerides, total cholesterol, LDL-cholesterol and HDL-cholesterol may be estimated by using spectrophotometer.

Triglycerides

Triglycerides may be determined by enzymatic method (GPO-PAP method), using the commercially available kit.

Procedure: Three cuvettes are washed with distilled water and are labelled blank, standard and sample. 20 µl distilled water, 20 µl standard and 20 µl sample, are pipetted in each cuvette respectively. Chromogen reagent, 2 ml is added to each cuvette, contents of all the cuvettes are mixed thoroughly and incubated for 5 minutes at room temperature. The wavelength of spectrophotometer is set at 500 nm. Result command is given to spectrophotometer and after some time results are displayed. The blood triglycerides levels are calculated by applying the following formula.

$$\text{Triglycerides mg/dl} = \frac{\text{Absorbance of sample}}{\text{Absorbance of standard}} \times 200$$

Total Cholesterol

Rapid enzymatic determination of the total cholesterol by CHOD-PAP method, may be performed by using the commercially available kit.

Procedure: Three cuvettes are washed with distilled water and are labelled blank, standard and sample. 20 µl distilled water, 20 µl standard and 20 µl sample are pipetted in each cuvette respectively. Chromogen reagent, 2 ml is added to each cuvette. Contents of all the cuvettes are mixed thoroughly and incubated for 5 minutes at 37°C. The wavelength of spectrophotometer is set at 500 nm. Result command is given to spectrophotometer and after some time results are displayed. The blood cholesterol levels are calculated by applying the following formula.

$$\text{Cholesterol mg/dl} = \frac{\text{Absorbance of sample}}{\text{Absorbance of standard}} \times 200$$

LDL-Cholesterol

LDL-cholesterol is determined by precipitation method. Tests may be performed by using the commercially available kit.

Procedure: For sample preparation; 100 µl sample and 1000 µl precipitant are placed in a tube. After through mixing the tube is allowed to stand for 15 minutes at room temperature and then is centrifuged at 1500 rpm for 15 minutes. Supernatant is separated from the sediment and cholesterol is measured by the CHOD-PAP method. The LDL-cholesterol levels were calculated by applying the following formula.

LDL-cholesterol mg/dl = Total cholesterol – Cholesterol in supernatant

HDL-Cholesterol

HDL-cholesterol may be determined by using the commercially available kit.

Procedure: For sample preparation; 200 µl sample and 500 µl precipitant are placed in a tube. After through mixing the tube is allowed to stand for 10 minutes at room temperature and then is centrifuged at 4000 rpm for 10 minute. Supernatant is separated from the sediment and HDL-cholesterol is measured by the CHOD-PAP method.

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