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RESEARCH ARTICLE

A STUDY ON LIPD PROFILE IN PROSTATE CARCINOMA PATIENTS ADMITTED IN AIIMS, NEW DELHI.

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ABSTRACT

Prostatic carcinoma is a leading cause of morbidity and mortality in elderly men. Hyper cholesteremia has been classically associated with increased risk of prostate cancer. Recent studies have also shown hypocholesteremic patients raising doubts as whether cholesterol helps in initiating tumour or just consumed more by the tumor cells. These studies have developed a growing consensus whether cholesterol has any role in cell proliferation and tumorogenesis. The present study aims to explore this event. Serum levels of lipids and prostate specific antigen (PSA) were measured in carcinoma prostate, benign prostatic hyperplasia, sham controls (radical cystectomy patients) and normal subjects using enzyme based kit methods. Plasma LDL cholesterol was decreased in carcinogenic specimen(s) as compared to the specimen(s) from normal subjects.

Key words: Cholesterol, LDL receptor, Cell proliferation, Prostate cancer.

INTRODUCTION:

Cholesterol molecule has been implicated in number of human diseases in spite of its need in steroid hormone synthesis, bile production and cell membrane formation. Whereas hypercholesteremia is found to be associated with atherosclerosis [1], hypocholesteremia has been seen in association with cancers[2]. An exponential fall of plasma lipoproteins was noted with the incidence of leukemic cancer, whereas triglycerides were significantly elevated without any known reason [2] [3] [4]. Henriksson et al. showed total cholesterol levels in blood were decreased in patients with metastatic prostatic carcinoma probably due to faster clearance of LDL[3].Whether this phenomenon is truly due to an increased cholesterol uptake by the cells, is not yet transparent; the over-expression of LDL receptor in prostate cancer cell has already been approved[4].

In the case of adenoma, the level of prostatic tissue cholesterol has been reportedly increased against normal tissue, was observed as early as in 1942 and is now presumed to be due to a perturbation in sterol mediated feedback mechanism via sterol regulatory element binding proteins (SREBPS)[5]. The association between the use of statins (cholesterol lowering drugs) and reduced risk of advanced carcinoma prostate[8-10] and down regulation of CDK2, CDK4, CDK6 and Cyclin D1[6][7] with arrest of cells in S-phase clears the fact that cholesterol is involved in developing cacinogenic cells, albeit exact mechanism is unknown.

Therefore, the goal of the present study with prostate carcinoma cells intends to find the role of cholesterol in cancer cell proliferation.

MATERIALS AND METHODS:

Cholesterol, trigycerides and HDL estimation kit were obtained from *Erba Diagnostics, Mannheim, Germany. Prostate specific antigen (PSA) estimation kit was obtained from Calbiotech Inc. CA, U.S.A. All reagents and chemical used in this study were of analytical grade quality. All the specimens were collected following given approval from Institute Ethics Committee.*

PSA was estimated by microplate immunoenzymometric (ELISA sandwich) assay. Total plasma cholesterol estimation was based on cholesterol oxidase method(Modified Roeschlau's Method)[11]. Trigycerides estimation was based on glycerol phosphate oxidase method (by Wako and the modification by Mcgowan et al and Fossati et al [12]. HDL estimation was based on phosphotungstic method (by Burstein et al)[13].

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Unpaired Student t test were performed using SPSS version 17 software.

RESULTS:

Plasma parameters:

In Table-1, the increase of prostate specific antigen (PSA) in patient's serum confirmed the presence of cancer in prostate tissue. Although no other parameters changed very significantly, at least a trend to decreased plasma LDL cholesterol was observed in carcinogenic specimen(s) as compared to the specimen(s) from normal subjects. Surprisingly there was an increase of triacylglycerol (TAG) concentration in carcinoma prostate tissue, the reason of which is currently not known. There was only a kind of random variation without having any significant change in total cholesterol and HDL concentration among the study groups.

DISCUSSION:

The study of cholesterol in respect of cancers has been an old quest. Since cholesterol is a major component of the cell membrane and cancer is a state of over growth of tissue cells; the instant quip is to consign more cholesterol into the tumor cells to support the instantaneous membrane formation of new cell synthesis.

No significant change was observed on serum cholesterol concentration (total and LDL) with the gravity of neoplasm in the systemic blood of prostate cancer patients (Table – 1). The amount of cholesterol taken by carcinoma prostate, originally a tiny gland, may not be abundant enough to built a witty change for cholesterol concentration in whole blood volume. Surprisingly, triacylglycerol concentration was increased in the blood. This indicated the plausibility of utilization of glucose for more triacylglycerol synthesis as well as to support the energy supplement for the survival of tumor cells.

Prostate being a very small organ, the net utilization of plasma cholesterol by the prostate tissue mass was not expected substantial enough to make a very significant change in cholesterol concentration to systemic blood circulation.

Studies have shown that elevated cholesterol levels in prostate cancer cells have been found to result from aberrant regulation of cholesterol metabolism [14]. A fall in blood cholesterol level is reflected only by a massive usage of plasma cholesterol by solid or floating tissues --- a scenario that has been reported earlier with hematological carcinoma[15][16]. Prostate is very small in size and the priority of surgery comes much earlier before to reach the cellular mass to the critical size that can make a fall in blood level of cholesterol by its consumption. This might be the reason here that blood level of cholesterol remained primarily unaffected by prostate cancer tissue in those subjects undergone prostate surgery.

Table 1: Comparison of plasma parameters in different study groups

Variable	Normal range	Normal(1) (n=25) (Mean±SD	Sham Control(2) (n=25) (Mean±SD)	Carcinoma Prostate(3) (n=25) (Mean±SD)	Benign Prostatic Hyperplasia(4) (n=25) (Mean±SD)	P Value
AGE		43.5±9.9	58.2±7.4	64.9±6.3	59.3±7.1	
T. Chol	25-160 mg/dL	174.5±34.2	149±18.9	170.2±28.0	154.3±16.6	1vs 3=0.70 1vs 4=0.65
TAG	140-250 mg/dL	131.6±55.1	132.0±45.75	165.3±45.7	121.3±47.4	1vs 3=0.074 1vs 4=0.607
HDL	30-65 mg/dL	46.3±16.3	32.7±5.2	40.7±12.4	34.9±8.5	1vs 3=0.291 1vs 4=0.032
LDL	<130 mg/dL	102.5±39.3	90.0±14.4	96.9±26.2	95.15±13.2	1vs 3=0.643 1vs 4=0.526
PSA	<4 ng/ml	0.53±0.24	1.07±0.49	15.18±6.81	4.33±1.79	1vs 3=0.0001 1vs 4=0.0001

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