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Research Article

Analysis Of Serum Estradiol Hormone Levels In Patients Of Prostate Carcinoma In Indian Population

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ABSTRACT

The exact mechanism of prostate carcinogenesis remains unknown. Recent research suggests a role of estrogen and their receptors in the etiology and progression of prostate cancer. This study aimed at evaluating the correlation between serum Total PSA levels and serum Estradiol (E2) levels in Prostate cancer patients. This will enable us to get a clear perspective of the use of estrogen metabolites for the diagnosis of prostate cancer.
Serum Total PSA and Serum Estradiol levels were measured by Electrochemiluminescent (ECLIA) assay. The Total PSA levels in the serum samples of all prostate cancer patients were observed to be elevated, while Serum estradiol levels did not show any significant difference between the patient and control group.
The present study did not show any clinical significance between the serum estradiol and Total PSA levels. Thus, the reliability of estradiol for the diagnosis of Prostate cancer requires further investigation. Larger studies will be required to explore the potential role of estradiol in prostate cancer diagnosis.

INTRODUCTION:

Prostate cancer is the second most common cause of cancer in India as per the Indian Council of Medical Research (ICMR) and various state cancer registries; and the sixth leading cause of cancer death among men worldwide [1]. It usually affects men in age group of 65+ years and is thus termed as 'malignancy of elderly males'. However, recently there has been an increase in reports of cancer in younger men in the age group of 35-44 and 55-64 residing in metropolitan cities. Old age, obesity, improper diet, and genetic alterations have been identified as some of the main contributing factors towards increased incidence of prostate cancer [2].

In India, the 5-year survival rate for prostate cancer is 64%. It has been revealed that those patients treated with surgery had better survival (91%). These findings prove that while treatment may save a life or extend the number of survival years, awareness about and prevention of the disease is extremely crucial [2]. The incidence rate of Prostate cancer in India is 9-10/100000 population which is higher than other parts of Asia and Africa but lower than USA and Europe (1). The incidence rates of this cancer are constantly and rapidly increasing in all the Population Based Cancer Registries (PBRCs), and the cancer projection data shows that the number of cases will double by 2020 [1,2].

The exact mechanism of prostate carcinogenesis remains unknown; however, it is believed to involve a combination of dietary, environmental, genetic, lifestyle and hormonal causes. Numerous studies have been conducted on the hormonal regulation of prostate cancer. However, the major focus has been largely on the androgen action. But more recent research suggests a role of estrogen in the etiology and progression of prostate cancer [3]. Estrogens and their receptors have been reported to be implicated in the Prostate carcinoma development and progression [4,5]. According to Bosland MC, 1995 and McPherson SJ, 2001, androgen plus estrogen, but not androgen alone, induces prostate malignancy [6,7].

In comparison to androgens, the role of estrogens in prostate carcinogenesis is more elusive. There is ample body of evidence suggesting that estrogens may play a critical role in predisposing or even causing prostate cancer. There is correlative evidence in humans that indicates an effect of estrogen on the prostate gland that is conducive to cancer onset [3,9-11]. However, there are other set of studies concluding the opposite finding, with an increasing prostate cancer risk associated with decreasing estradiol levels [12-14]. Till date, there has been no studies on estradiol hormone and serum total PSA levels in Indian Prostate carcinoma patients. Estrogens are responsible for the development of the secondary female sex characterisitcs. Together with gestagens, they control all the important female reproductive processes. The biologically most active estrogen is 17β-estradiol. This is a steroid hormone having a molecular weight of 272 daltons. In this study, we will be evaluating the correlation between serum Total PSA levels and serum Estradiol (E2) levels in Prostate cancer patients. This will enable us to get a clear perspective of the use of estrogen metabolites as a marker for prostate cancer.

MATERIALS AND METHODS

Subjects: A total of 48 Prostate cancer patients diagnosed at Delhi State Cancer Institute, Delhi, India, were included in this study. The average age of the patients were 67 years.The Serum levels of tumour marker Total PSA and serum Estradiol levels were analyzed. Nine healthy individuals (average age: 65 years) served as controls for the study.The study was approved by the Institutional Review Board. Informed consent was obtained from all the subjects and Controls.

METHODS

Serum Total PSA and Serum Estradiol levels were measured with an electrochemiluminescent (ECLIA) assay on Cobas e411, Roche Diagnostics, Mannheim, Germany. The reference ranges are 0 – 4.0 ng/ml for Total PSA and 7.63 – 42.6 pg/ml for Estradiol.

RESULTS

The Total PSA levels in the serum samples of all prostate cancer patients included in the study have been observed to be elevated. However, the relative amounts of estradiol were observed to be similar to the estradiol values in the control cases.

The average Serum Total PSA levels was observed to be 884ng/ml, while the average serum levels for Estradiol was observed to be 17pg/ml in the patient group. Whereas, in the control group, the average Serum Total PSA levels were observed to be 0.8ng/ml, while the average serum levels for Estradiol were observed to be 25pg/ml.

DISCUSSION

The health of the prostate has long been considered dependent on the level of the male hormones

collectively known as androgens, however, it is now recognized that estrogens and their metabolites (estrogens broken down by chemical processes in the body) play a role in its normal growth as well as in prostate cancer.

According to an article published by Georgetown University Medical Centre, a high level of one type of estrogen in a man's body might increase his risk of developing prostate cancer. However, at the same time, according to another group of studies, the high levels of the estrogen, considered to be fuel for breast cancer might offer a protective benefit against prostate cancer [15].

There is an existing hypothesis that increased circulating estrogens might elevate prostate cancer risk and act through the estrogen receptor. This idea is supported by the finding that estrogens enhance androgen-induced prostate cancer in animal models [16].

However, the present study carried out on 48 Carcinoma Prostate Indian patients, did not show any clinical significance in the serum estradiol levels; while all the patients exhibited elevated Total PSA levels. Thus, estradiol may not be an effective parameter in the diagnosis of Prostate cancer.

CONCLUSION:

Since the present study did not show any clinical significance with respect to serum estradiol values in Indian Prostate carcinoma patients, the reliability of estradiol for the diagnosis of Prostate cancer requires further investigation. Larger studies will be required to explore the potential role of estradiol in prostate cancer etiopathogenesis and diagnosis in Indian patients.

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