

Haemato-Biochemical Studies in Patients with Cervical Cancer of Rural and Urban Area of Salem District, Tamil Nadu, India

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Abstract

Cervical cancer is a type of cancer that occurs in the cells of the cervix, the lower part of the uterus that connects to the vagina. It is due to the abnormal growth of cells that have the ability to invade or spread to other parts of the body. In cervical cancer patients a simple and easy blood based tumor marker system might be an useful tool to know extent of tumor progression. Subsequently, such markers can be useful to correlate with the response to anticancer treatment and disease recurrence. Keeping in view, the present study to investigate the haemato-biochemical profile changes in cervical cancer patients of rural and urban area of Salem district. Eighty eight samples of cervical cancer and equal number of health control subjects were taken in this study. Results of the study indicates that cancer has a significant impact on some of the haematological and biochemical parameters. It is recommended that all cervical cancer patients should have routine haematological and biochemical markers monitoring to reduce the negative effect of the disease and improve the quality of life of cervical cancer patients in Salem area. There is need for public enlightenment programme on prevention and need for regular Pap smear screening among women in the area.

Keywords: Dental Radiography, Diagnosis, Oral Radiology, Three Dimensional Imaging, Cone Beam Computed Tomography

Introduction

Worldwide, cervical cancer is the second most common cancer in women; and is estimated to cause over 470,000 new cases and 233,000 deaths each year. Cervical cancer is a type of cancer that occurs in the cells of the cervix, the lower part of the uterus that connects to the vagina. It is due to the abnormal growth of cells that have the ability to invade or spread to other parts of the body. Among the women, cervical cancer is the second most common cancer in developed regions and the fourth-most common cause of death from cancer in women (Ferlay *et al.*, 2008). In 2012, an estimated 528,000 cases of cervical cancer occurred, with 266,000 deaths. This is about 8% of the total cases and total deaths from cancer. About 70% of cervical cancers occur in developing countries and 90% of the deaths. In low-income countries, it is one of the most common causes of cancer death (World Cancer Report, 2014)

The cervical cancer is by far the most common Human papillomavirus infection (HPV) related disease (Kumar *et al.* 2007). Other risk factors includes smoking, a weak immune system, birth control pills, starting sex at a young age and having many sexual partners, but these are less important. Human papillomavirus vaccine protects against between two and seven high-risk strains of this family of viruses and may prevent up to 90% of cervical cancers. In cervical cancer patients a simple and easy blood based tumor marker system might be an useful tool to know extent of tumor progression. Subsequently, such markers can be useful to correlate with the response to anticancer treatment and disease recurrence. Keeping in view, the present study to investigate the serum biochemical profile and histological changes in cervical cancer patients of rural and urban area of Salem district.

Materials and Methods

Study Design

The cervical cancer patients were adopted in this study and participants were recruited from a rural and urban area in Salem district, Tamil Nadu, Southern India. Eighty eight women were selected using non-probability

convenience sampling technique. The inclusion criteria were: i) those between the ages of 20 and 70 years ii) who were willing to participate in the study, iii) who were able to read, write and understand Tamil, the local language. Women who had been diagnosed of cervical cancer were excluded from the study. This study used a socio-demographic questionnaire on cervical cancer that were developed by the authors. The socio-demographic questionnaire consisted of nine items, which were regarding the participant's age, locality, educational qualification, occupation, habits, marital status, family history of any cancer or cervical cancer and stages of cervical cancer. Equal number of health control subjects were taken in this study.

Biochemical Parameters

The blood samples were collected from each woman aseptically in heparinised tubes and were centrifuged at 2500rpm for 10mts. The plasma of the samples were collected in sample containers and then the biochemical parameters were analyzed. These biochemical parameters includes Total Protein, Albumin, Globulin, Uric acid, Glucose (while fasting and post prandial) TG, ALP, Gamma Glutamyl Transferase, Cholesterol, HDL – Cholesterol, SGOT, SGPT, Creatinine, Blood Urea Nitrogen (BUN), HB, RBC, and WBC.

Ethical Considerations

This study received ethical approval from Institutional Ethics Committee, Government Mohan Kumaramangalam Medical College and Hospital, Salem. The women gave written consent for the study, prior to their participation. They were assured of confidentiality and were informed that they had the right to withdraw from the study at any time they wished to.

Date Collection

It is unacceptable that every two minutes one woman dies of cervical cancer in a world where we have the proven solutions to prevent and treat this disease. The WHO's improving data for decision making toolkit will support countries in collecting and using high quality data on screening coverage and uptake, interventions can be employed to make sure no woman is left behind, strong data systems will support global efforts to make this cancer a disease of the past. High quality and timely data are essential for comprehensive cervical cancer control programmes and under-pin effective policy making. A cross sectional questionnaire based survey has been conducted on 88 women (both married and unmarried, covering both rural and urban areas). Among those 88 the following cross sectional study was carried out.

- Assessment and diagnostic findings PAP Test
- Routine screening for cervical abnormalities can detect early stage cancer and precancerous conditions that could progress to invasive disease. The process begins with a Pap test, also known as a Pap smear.
- HPV DNA Test
- Like the Pap test the HPV DNA test involves collecting cells from the cervix for collecting cells from the cervix for lab testing
- CT (Computerised Tomography) scan
- MRI (Magnetic Resonance Imaging Scan)
- Pelvic ultrasound

The precision medicine field of targeted therapy involves testing tumours for clues about their genetic mutations and matching patients with new drugs designed to block cancer's growth on a molecular level. Patients who received molecular targeted therapies either got an investigational drug then being tested in a clinical trial or an FDA approved targeted therapy commercially approved for another indication.

Statistical Analysis

The analysis involved a description of the sample according to the socio-demographic variables. Mean of the overall knowledge was calculated. To analyze the differences in the mean student 't' test was computed with a statistical significance level of $P < 0.05$ using SPSS.

Results

Table 1 shows the haemato-biochemical analysis in cervical cancer patients and health control subjects. In the present investigation, the serum level of Total Protein, Albumin, Globulin, and Uric acid are on the higher side of the normal reference range while the blood glucose levels (Post Prandial and Fasting) are on the lower side of the normal reference range. The cervical cancer patients total protein, albumin, globulin and uric acid levels were 7.45 ± 0.74 g/dl, 4.16 ± 0.41 g/dl, 3.29 ± 0.31 g/dl and 4.53 ± 0.76 mg/dl respectively while health control subjects 7.32 ± 0.86 g/dl, 4.05 ± 0.37 g/dl, 3.27 ± 0.29 g/dl and 4.39 ± 0.68 mg/dl respectively.

The blood glucose levels observed cervical patients were 110.40 ± 13.33 mg/dl for glucose (pp) and 83.19 ± 7.57 mg/dl glucose (fasting) while health control subjects were 112.32 ± 12.64 mg/dl for glucose (pp) and 85.03 ± 8.95 mg/dl glucose (fasting). The TG, ALP, Gamma Glutamyl Transferase and Cholesterol levels are 205.69 ± 14.59 mg/dl, 124.97 ± 11.76 U/L, 131.48 ± 10.49 U/L and 35.03 ± 16.28 mg/dl respectively while health

control subjects were 99.17±10.21mg/dl, 71.52±12.68U/L, 44.83±9.43U/L and 184.62±11.29mg/dl respectively. The HDL cholesterol level was 34.28±3.46mg/dl and 52.49±2.48mg/dl for cancer and health control subjects. The observed values of SGOT, SGPT, Creatinine and Blood Urea Ni-trogen (BUN) were 20.51±6.17 U/L, 25.03±5.88U/L, 1.28±0.17ml/dl and 16.36±3.04 mg/dl respectively while health control subjects were 19.50±5.24U/L, 23.98±4.37U/L, 0.85±0.13ml/dl and 15.94±3.59mg/dl respectively. The observed level of Hb, RBC and WBC count were 9.85±0.81gms%, 4.88±0.83 cells/cumm and 12030.42±1545.79 cells/cumm, respectively while health control subjects were 13.05±0.48gms%, 5.02±0.57cells/cumm and 7805.68±1327.54 cells/cumm respectively.

Table.1: Haemato-Biochemical Analysis in Cervical Cancer Patients and Health Control

Parameters	Patients		P value
	Cervical cancer patients (N=88)	Normal patients (N=88)	
Total Protein (g/dl)	7.45±0.74	7.32±0.86	0.283 ^{NS}
Albumin (g/dl)	4.16±0.41	4.05±0.37	0.063 ^{NS}
Globulin (g/dl)	3.29±0.31	3.27±0.29	0.659 ^{NS}
Uric acid (mg/dl)	4.53±0.76	4.39±0.68	0.199 ^{NS}
Glucose-PP (mg/dl)	110.40±13.33	112.32±12.64	0.328 ^{NS}
Glucose -Fating (mg/dl)	83.19±7.57	85.03±8.95	0.142 ^{NS}
TG (mg/dl)	205.69±14.59	99.17±10.21	0.000*
ALP (U/L)	124.97±11.76	71.52±12.68	0.000*
GGT (U/L)	131.48±10.49	44.83±9.43	0.000*
Cholesterol (mg/dl)	235.03±16.28	184.62±11.29	0.000*
HDL-Cholesterol (mg/dl)	34.28±3.46	52.49±2.48	0.000*
SGOT (U/L)	20.51±6.17	19.50±5.24	0.243 ^{NS}
SGPT (U/L)	25.03±5.88	23.98±4.37	0.180 ^{NS}
Creatinine (mg/dl)	1.28±0.17	0.85±0.13	0.000*
Hb (gms%)	9.85±0.81	13.05±0.48	0.000*
RBC (cells/cumm)	4.88±0.83	5.02±0.57	0.193 ^{NS}
WBC (cells/cumm)	12030.42±1545.79	7805.68±1327.54	0.000*

Values are expressed as Mean ± SD, N=88. Data was calculated by student t-Test (Independent sample, P value two tail), statistically significant level 0.05, using SPSS ver. 20. *P<0.05 and NS non-significant (^{NS}P>0.05)

Discussion

Blood act as a pathological reflector of the status of exposed patient to infections and other conditions (Olafedehan *et al.*, 2010). Laboratory tests on the blood are vital tools that help detect any deviation from normal in the animal or human body (Ogunbajo *et al.*, 2013; Abdullahi, 2009). According to Afolabi and colleagues (2010), changes in haematological parameters are often used to determine various status of the body and to determine stresses due to environmental, nutritional and/or pathological factors. The examination of blood gives the opportunity to investigate the presence of several metabolites and other constituents in the body and it plays a vital role in the physiological, nutrition and pathological status of an organism (Doyle, 2006 and Aderemi, 2004). According to Olafedehan and colleagues (2010) examining blood for their constituents can provide important information for the diagnosis and prognosis of diseases in patients. Blood constituents change relation to the physiological conditions of health (Togun *et al.*, 2007). These changes are of value in assessing response of animals or human to various physiological situations (Khan and Zafar, 2005).

Certain blood biochemical parameters are reported to be change in cervical cancer patients. Significant higher levels of serum Lactate dehydrogenase, Gamma glutamyltransferase and alkaline phosphatase activity is observed in cervical cancer (Ramteke *et al.*, 2014; Krishnamurthy *et al.*, 2008). In cervical cancer patients the total protein, glycogen, total lipid, cholesterol, triglycerides and fatty acids in neutrophils increased significantly compared to control subjects (Krishnamurthy *et al.*, 2008).

The higher level of gamma glutamyltransferase observed in the present investigation is in agreement with the findings of Ramteke *et al.*, (2014), Malkin *et al.*, (1978), Desai and Chetna, (2009), Polterauer *et al.* (2011). Serum GGT within its normal range might be an early and sensitive enzyme related to oxidative stress (Lee *et al.*, 2004, Lee *et al.*, 2008). It is well known that cervical cancer is a state of oxidative stress showing statistically significant increase of lipid peroxidation (LPO) while the antioxidant status was depicted by decreased glutathione (GSH) and superoxide dismutase (SOD) (Kim *et al.*, 2002; Srivastava *et al.*, 2009; Nirmala and Narendhirakannan, 2011; Subramanyam *et al.*, 2013). Thus, as an adaptive response to protect against oxidative stress by facilitating intracellular recovery of cysteine from extracellular glutathione (GSH),

the expression of GGT is significantly increased in rapidly dividing neoplastic cells of cervix for synthesis of proteins and intracellular glutathione (GSH). The presence of elevated GGT levels seems to reflect a state of persistent oxidative stress as a part of biological pathway related to cancer development. Elevated serum GGT might be produced from the tumor itself as a part of tumor microenvironment (Ramteke *et al*, 2014).

Haematological parameters are those parameters that are related to the blood and blood forming organs (Bamishaiye *et al.*, 2009; Waugh *et al.*, 2001). The role of haemoglobin levels in clinical outcomes has been extensively examined in gynaecological malignancies, such as cervical, ovarian, and endometrial cancer. In 1989, a retrospective study of 386 patients with advanced cervical carcinoma treated with radiotherapy established that anaemic patient had higher risk of treatment failures (Girinski *et al.*, 1989). Our finding is consistent with various studies which established an association between haemoglobin level and cervical carcinoma (Ahmed, *et al.*, 2017; Fuso *et al.*, 2005). In the present study agreement with Saa'd Merza Al-Araji and Naseer Jawad Hamad (2005) studies showed that there was marked increase in WBC count, erythrocyte sedimentation rate and marked decrease in hemoglobin and haematocrit.

Conclusions

This study indicates that cancer has a significant impact on some of the haematological and biochemical parameters. It is recommended that all cervical cancer patients should have routine haematological and biochemical markers monitoring to reduce the negative effect of the disease and improve the quality of life of cervical cancer patients in Salem area. There is need for public enlightenment programme on prevention and need for regular Pap smear screening among women in the area.

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