International Journal of Innovative Research in Medical Science (IJIRMS)
Volume 03 Issue 02 February 2018, ISSN No. - 2455-8737
Available online at - www.ijirms.in

Open Access Journal | Research Article | DOI: 10.23958/ijirms/vol03-i02/10

Hormones in HIV- Pregnant Women

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Abstract

Background *- HIV infected pregnant women are placed on antiretroviral drugs for treatment and to avoid maternal to child transmission of HIV. This effect of HIV infection on pregnancy hormones within 24 weeks of pregnancy compare with normal pregnant women.*

Aims and Objectives *- estimate testosterone, Luteinizing hormone (LH), Follicle-stimulating hormone (FSH) and Prolactin (Prl) in HIV pregnant women compare to normal Healthy pregnant women.*

Result *- The level of hormones in normal pregnant women and HIV positive pregnant women. Hormone level in HIV pregnant women were significantly decreased found compare to normal pregnant women.*

Conclusion: *On the basis of our study we concluded that the hormone levels were significantly decreased found in HIV pregnant women due to hormones are affected by HIV / AIDs. The bidirectional interactions between hormones and the immune system contribute to both the outcome of pregnancy and female susceptibility to disease.*

Keywords *- AIDs, HIV, CD4+T, ROS, Luteinizing hormone, Follicle-stimulating hormone and Prolactin.*

Introduction

In 1986 the first case of HIV was reported in India. Later on, the Government of India established a national AIDS control committee under the ministry of Health and Family welfare to formulate a strategy for responding to HIV- Aids prevalence.[1] HIV prevalence has been increasing among pregnant women in many regions within the country, hence India launched a National AIDS Control Programme in 1987.[2]

India has the third largest HIV epidemic in the world. In 2015, HIV prevalence in India was an estimated 0.26%. This figure is small compared to most other middle-income countries but because of India's huge population (1.2 billion) this equates to 2.1 million people living with HIV. In the same year, an estimated 68,000 people died from AIDS-related illnesses.[3] Overall, India's HIV epidemic is slowing down, with a 32% decline in new HIV infections 86,000 in 2015, and a 54% decline in AIDS-related deaths between 2007 and 2015.[4] India has the third largest HIV epidemic in the world. The HIV epidemic in India is driven by heterosexual sex, which accounted for 87% of new infections in 2015. However, the epidemic is concentrated among key affected populations such as sex workers. The vulnerabilities that drive the epidemic are different in different parts of the country. Six state in India are consider to have high HIV/ AIDs prevalence Manipur, Mizoram, Nagaland, Andhra Pradesh, Maharashtra and Karnataka are in the south or east of the country. Some states in the north and northeast of the country have also reported rising HIV prevalence.[5] A large majority of those infected lived in non-industrialized countries with inadequate financial support to handle the pandemic.

HIV or AIDS pregnant women suffer from several opportunistic infections that occur because of poor immunity. The HIV infection is cellular CD4 immunodeficiency. Different agents appear may trigger apoptosis in CD4+ T cell, including viral protein, inappropriate secretion of inflammatory cytokines by activated macrophages and toxins produced by opportunistic microorganism. Since oxidative stress can also induce apoptosis, it can be hypothesized that such a mechanism could participate in CD4+ T cell apoptosis observed in AIDS. Oxidative stress results from the imbalance between reactive oxygen species (ROS) production and inactivation.[6]

Hormones are chemicals in your body that are carried in your blood stream and send messages between different organs. They are formed in glands and organs, and they control all sorts of processes in the body. Hormones have an effect on your growth, metabolism, sex drive, and ability to have children.

Human immunodeficiency virus (HIV) infection is a worldwide problem and HIV/AIDS patients suffer from several opportunistic infections that occur because of poor immune system function. Oxidative stress results from the

imbalance between reactive oxygen species (ROS) production and inactivation.[7] HIV weakens the defensive role of the human immune system. Once HIV infects a person, the body attempts to overcome the virus by generating antibodies to fight it off. However, in a rate-limiting process, progression of the disease weakens the body's immune system to thwart off and even defend from infection. As the immune system becomes compromised, several opportunistic infections develop that give rise to AIDS.

Pregnancy in HIV-positive women might be associated with at least small increases in risk of adverse maternal outcomes that include spontaneous abortion, stillbirth, fetal abnormality, perinatal mortality, low birth weight and pre-term delivery. These adverse effects might be the result of endocrine abnormalities in HIV patients. The effects of HIV infection on pregnancy hormones within 28 weeks of pregnancy

Several studies have shown that HIV/ AIDs can affect the body's ability to make hormones and keep healthy hormone levels. There are many types of hormones. The hormones that seem to be particularly affected by HIV are the estrogen, progesterone, Testosterone, DHEA (Dehydroepiandrosterone), Luteinizing hormone (LH), Follicle-stimulating hormone (FSH) and Prolactin (Prl). This study was carried out to investigate the possible changes in pregnancy hormones (Testosterone, LH, FSH, Prl) of HIV-positive women within the few weeks of pregnancy prior to antiretroviral therapy. The effect of HIV infection on pregnancy hormones within 24 weeks of pregnancy.

Materials & Methods

I. Selection of Patients

The study was carried out in the dept. of Biochemistry in collaboration with OBGY at CCM Medical College, Kachandur Durg (C.G). A total of 200 pregnant women with 2-3 weeks of pregnancy participated in the study as a study and control group. 100 of them were HIV seropositive; while the rest 100 were normal pregnant women were not commenced antiretroviral therapy.

II. Collection of blood samples

Overnight fasting venous 5ml blood samples were collected from HIV or AIDS and normal healthy pregnant women in plain bulb and EDTA bulb. The plasma was separated from plain vacuum tube, aliquoted and stored at -20°C and used for the estimate testosterone, Luteinizing hormone (LH), Follicle-stimulating hormone (FSH) and Prolactin (Prl). Serum hormones level were measured by using ELISA and reagents kits will purchased from RANDOX Laboratories Ltd.[8-11]

III. Data Analysis

Data were expressed as mean ±SD. Mean values were assessed for significance by paired student-t test. A statistical analysis was performed using the Stastical Package for the Social Science program (SPSS, 21.0). Frequencies and percentages were used for the categorical measures. Probability values $p < 0.05$ were considered statistically significant.

IV. Ethical committee Clearance

All studies on Human Volunteers were approved by the Institutional Ethics Committee of Chandulal Chandrakar Memorial Medical College Kachandur Durg (C.G).

Result and Discussion

Table no 1:- Shows Age wise distribution of Control group and HIV pregnant women.

Age Group	Pregnant Women (n=100)	HIV Pregnant Women (n=100)
23-24 yrs	12	8
25-26 yrs	34	23
27-28 yrs	30	27
29-30 yrs	15	31
Above 31	9	11

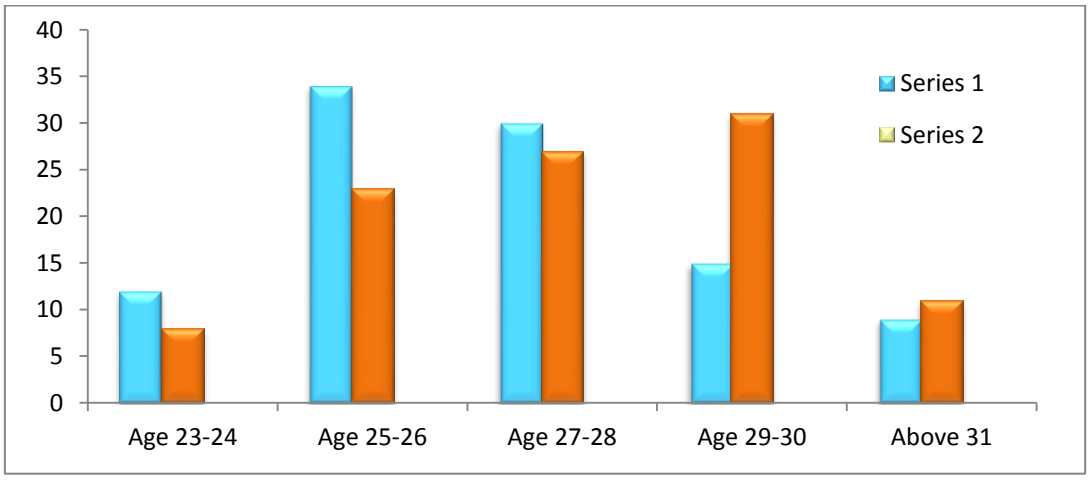

Table 2: shows the level of hormones in HIV positive pregnant women and normal pregnant women.

Antioxidants	Normal Pregnant women	HIV Pregnant women	Min	Max	'P' Value T test
Testosterone ng/ml	83.2 ± 8.9	61.1 ± 8.7	45.0	111.0	0.001
LH MIU/ml	1.85 ± 0.20	1.16 ± 0.27	0.6	3.7	0.001
FSH MIU/ml	4.79 ± .51	3.09 ± .64	2.0	6.7	0.001
PRL MIU/ml	10.04 ± .95	6.53 ± .94	5.0	13.0	0.001

Table no 2 shows the level of hormones in normal pregnant women and HIV positive pregnant women. Hormone level in HIV pregnant women were significantly decreased found compare to normal pregnant women.

Testosterone levels in normal pregnant women are 83.2 ± 8.9 and 61.1 ± 8.7 in HIV pregnant women. Testosterone deficiency in the setting of HIV has both primary and secondary causes. Primary causes, which account for approximately 25% of HIV-positive patients, involve etiologies that can cause gonadal failure. Tumor necrosis factor and interleukin-1 both of which have been shown to be up regulated in HIV infection-have been linked to decreased testicular steroid genesis. Secondary causes, which account for approximately 75% of HIV-positive patients with hypogonadism, act on the pituitary level.[12]

Adrenocorticotropic hormone (ACTH, or corticotrophin), which stimulates the adrenal cortex; two gonadotropins follicle-stimulating hormone (FSH) and luteinizing hormone (LH), which regulate the activity of the testes and ovaries. The activity of LH (1.16 ± 0.27, 1.85 ± 0.20) and FSH significantly decreased found in HIV pregnant women than normal pregnant women respectively (3.09 ± .64, 4.79 ± .51).

Prolactin, which stimulates mammary gland development and milk production. Prolactin level in HIV pregnant women were 6.53 ± .94 and 10.04 ± .95 in normal pregnant women. Albarracin CT et. al.[13] showed similar findings and concluded that Prolactin has been shown to regulate 20α-HSD at the gene expression level and Zhong L et. al.[14] Showed in situations of high demand of progesterone, such as pregnancy, prolactin down regulates 20α-HSD to allow progesterone levels to rise. We observed significantly lower plasma prolactin levels in HIV-infected women.

Pregnancy is associated with changes in concentrations of several hormones. During pregnancy, the reduced activity of natural killer cells, inflammatory macrophages, and helper T cell type 1 cells and production of inflammatory cytokines, combined with the higher activity of regulatory T cells and production of anti-inflammatory cytokines, affects disease pathogenesis. The severity of diseases caused by inflammatory responses is reduced and the severity of diseases that are mitigated by inflammatory responses is increased during pregnancy. The activity of innate immune cells contributes to the differential induction of cell mediated and humoral responses during pregnancy. Consideration of the diverse effects of sex steroids, in particular, on the functioning of the immune system may provide insight into why the pathogenesis of infectious and autoimmune diseases changes dramatically during pregnancy.

Hormones contribute significantly to the outcome of immune-related diseases during pregnancy by altering the functioning of immune cells. Hormones can have additional effects on the outcome of infection during pregnancy. For example, hormonal changes, including increased concentrations of P4, are hypothesized to alter not only local immune responses, but also genital tract mucosa, to increase the risk of HIV infection during pregnancy.[15] On the basis of our study we concluded that the hormone levels were significantly decreased found in HIV pregnant women due to hormones are affected by HIV / AIDs. The bidirectional interactions between hormones and the immune system contribute to both the outcome of pregnancy and female susceptibility to disease.

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