Effect of Progesterone on the Cervix of Albino Rat (Wistar strain): Histological Aspect

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Abstract

Physiological action of progesterone in target tissues such as uterus, ovary and mammary gland are studied but reproductive organ like cervix is least studied. The mucosa lines of the **cervix** ,the endocervix is continuous with that of the body of the uterus but differs from it, rather sharply in respect to the epithelium. Cervical mucus play a very important role in conception as well as contraception.

KEYWORDS- Cervix, progesterone, contraceptive.

INTRODUCTION

PROGESTERONE

During the last two decades, there has been a significant progress in the studies of hormonal contraceptives (Natural and Synthetic), such as Progesterone and their effects on the specific target organs. Graham et al. (1997) studied the physiological action of progesterone in target tissues such as uterus, **ovary** and mammary gland. Lee (1968) studied contraceptive and endometrial effects of medroxyprogesterone acetate, he commented that ovulation was inhibited for prolonged periods after a single injection. The effect of progesterone as as contraceptive on cervix is least studied. The present work is undertaken with a view to fill up this lacunae by giving descriptions on histopathology of cervix after the progesterone treatment at the light microscopy.

Progesterone is a major steroid secreted by the corpus luteum. In 1934, Butenandt, isolated this progestationally active substance (Butenandt and Westphal, 1934). Butenandt announced the complete synthesis of this hormone for which he and his co-workers in 1935 were awarded the Nobel prize in chemistry. Progesterone exists as colourless crystals or yellow-white odourless, tasteless powder. It is prepared commercially from diosgenin or stigmasterol, which are obtained from plant sources.

There is limited evidence that progesterone is carcinogenic in some laboratory species (Kordon et al; 1993 and Misdorp et al; 1992), but there are no epidemiological studies in the human (WHO,1979). Progesterone does not appear to be teratogenic in the humans (McDonough, 1985). Progesterone is known to be precipitating sideroblastic anaemia (Brodsky et al. 1994).

MATERIALS AND METHODS

ANIMALS:

Young, healthy, sexually mature female albino rats of Wistar strain (120-150 gms body weight) with normal reproductive history were procurred from Haffkine Biofarmaceuticals. The animals were kept under uncontrolled room ambient temperature and photoperiod . Food pellets marketed by Lipton India Limited and water provided **ad libitum**. The rats were acclimatized for a month to the laboratory

conditions prior to the commencement of any experiment .

The animals were divided into control and experimental groups, female rats belonging closely to a certain weight group were selected , the reason for which all the groups of rats at the commencement of the treatment did not weigh the same . The treatment lasted for 24 weeks duration i.e 24 injection of i.m.injectable progesterone of 100% purity which is available in the market with same trade name.

On the completion of the treatment period, the animals were weighed and sacrificed under light ether anaesthesia. The **cervix** was quickly excised cleared off the adhering fat blotted and weighed after which processed for the various light microscopic studies.

RESULT AND DISCUSSION:

CONTROL CERVIX -

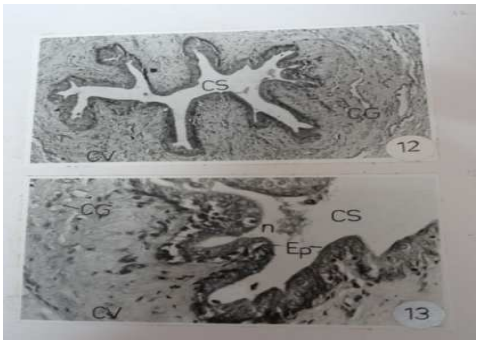

Fig. 1(a,b) – section of control Rat Cervix

Showing cervical ossicle(CS), nucleated

Stratified squamous epithelium (Ep),&cervical gland (X-40, 120)

The cervix is composed of mucosa and myometrium. The mucosa lines the cervix ,the endocervix is continuous with that of the body of the uterus but differs from it, rather sharply in respect to the epithelium .

The epithelial cells in the cervix are very tall , rarely ciliated and secrete true mucus . Occasional clefts extend deep into the stroma and constitute the cervical gland (figs.1). The cells lining these glands are extremely tall with abundant clear cytoplasm (fig.1).

The cervical glands present at the mucosa differ from those of the uterine gland by their branched structure (fig.1). They secrete mucus into the cervical canal. Unevenly stained nuclei are present at the centre of the epithelial cells. There is a normal nucleocytoplasmic distribution of the epithelial cells (fig. 1) .

PROGESTERONE TREATED CERVIX :

Progesterone do not alter the epithelial height and distribution . Nuclear pattern is also similar to that of the normal specimen (fig.2).

Glandular hypertrophy is evident but hypersecretion of the endometrial gland is relatively uncommon with progesterone administration (fig.2). Endometrial stroma is relatively compact with rather dense nuclei. Stromal vacuolation is a rare observation in this treated specimen (fig.2).

Fig.2 micrograph of cervix after the treatment with progesterone hypertrophied cervical gland(CG) compact stroma (STR) with dense nuclei(N).X-40.

Parameter	ControlValueX1(6)	Treated Value X2 (6)
Oestradiol pg/ml	158.64 $\pm$ 60.05	28.5 $\pm$ 14.2

DISCUSSION

CERVIX :

The present study demonstrates that following the treatment with progesterone there is glandular hypertrophy and hypersecretion in the cervical glands. Our observation collaborate with the findings of Maqueo et al (1964), who were able to detect the above changes in the rat cervix. They also concluded that stromal edema is a frequent finding during progestin therapy in human but in case of progesterone treate rat cervix, it is nonedematous.

Although it has been established that the cervical mucus play a very important role in conception as well as contraception. All efforts to correlate this with definite qualitative morphological changes in endocervical mucosa have failed.

The morphological changes in the present study which are attributable to progestational exposure form an orderly sequence which correlates well with the duration and intensity of therapy. Drugs administrated in the study may have reduced the cervical mucus secretion, considerably increased its cellularity and viscosity. However, it is not reasonable to assume that the incidence of glandular hypertropy would be less with the lower dosage regimens currently employed.

The hormonal investigation suggested that in progesterone treated rat, estradiol level decreased. This may bring about the changes in the cervical mucus. Gutierrez - Najar, Ginger - Velazquez and Martin - Mananton (1969) reported that either of the two steroids - estrogen and porgesterone facilitate and promote the cervical mucus production. These reports assume significance in the light of our findings that serum estradiol level of the treated animals was decreased..

Drug dosage used in our experiments confirm to human dosage, the results are alarming. The cytoarchitecture of the epithelial cells of the cervix shows alterations at the cytological level

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