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# Changes in Plasma Concentrations of Estrogen and Progesterone During Pre-Partum Cervico Vaginal Prolapse in *Bos Indicus* (Cattle)

**K. Rajamanickam, M. Sameer Ali and V. Leela[1]**

Department of Veterinary Physiology, Madras Veterinary College, TANUVAS, Chennai - 600 007, Tamil Nadu.

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## Abstract

Current study evaluates the changes in estrogen and progesterone during pre-partum cervico-vaginal prolapse in *Bos indicus* cattle. A total of 24 pregnant cattle during their third trimester of pregnancy were selected and based on presence of cervico-vaginal prolapse, they were grouped into prolapsed group (n=12) and control group (n=12). Radioimmunoassay was used to estimate the concentrations of hormones. The results revealed that estrogen concentration was higher in prolapsed group than in control ($p<0.01$). No statistical difference was seen in progesterone concentration between the groups. This indicates estrogen has influence on the occurrence of cervico-vaginal prolapse in *Bos indicus* cattle.

**Keywords:** Cervico-vaginal prolapse, estrogen, progesterone, cattle

Cervico vaginal prolapse most frequently affects the pluriparous cows. Hormonal, nutritional and genetic components interplay with each other and precipitates in eversion of genital organs (Kahn, 2005). Feed containing mycotoxins will cause hyperestrogenic effect in pregnant animals and lead to prolapse of reproductive organs (Minervini and Dell'Aquila, 2008). Genetic predisposition which favour vaginal prolapse was found in Brahman, Hereford and Brahman crossbred cattle breeds (Purohit, 2010). Even though cervico-vaginal prolapse has multiple aetiologies, changes in the levels of estrogen and progesterone have major role in the pathogenesis of this condition (Hafez and Hafez, 2000). Hence, the present study was conducted to identify the changes in these hormones during pre-partum cervico-vaginal prolapse in *Bos indicus* (cattle).

[1]*Corresponding author* : Email : leela.v@tanuvas.ac.in

## Materials and Methods

Blood samples were collected from jugular vein in EDTA vial from twenty four cattle during their third trimester of pregnancy (7 to 9 months of gestation). Based on the presence of cervico-vaginal prolapsed they were classified into control group (animals with normal pregnancy, n=12) and prolapsed group (animals having pregnancy with cervico-vaginal prolapse as complication, n=12). Majority of these animals were in fourth parity (average gestation period for two groups was about 240±10 days) and had body condition score more than 3.5 to 5.Plasma was immediately separated and stored in -80°C for analysis. Concentration of plasma estrogen and progesterone were assessed by competitive radioimmunoassay by using kit obtained from Immunotech Beckman Coulter Inc. REF 1M1188.Student's t-test was used to identify the statistical difference in these hormones levels between the two groups. The concentrations of estrogen and progesterone were represented as mean± standard error. All analyses were performed using SPSS IBM Version 23 software.

## Results and Discussion

Estrogen concentration was found to be higher in cattle with cervico-vaginal prolapse when compared to the control group ($p<0.01$). The maximum estrogen concentration in the prolapsed group was 92.5 pg/mL, which was twice higher than the control group. There was no statistical difference in the progesterone concentration between control and prolapsed group (Table I).

Estrogen concentration of the animals with prolapse was higher than estrogen level of animals in control group. Similar results were obtained in ewes with ante partum vaginal

**Table I:** Comparision of estrogen and progesterone concentrations between the groups by student's - t test

| Parameters | Control group | | Prolapsed group | |
|---|---|---|---|---|
| | Mean±SEM | Range (min-max) | Mean±SEM | Range(min-max) |
| Estrogen (pg/mL) | 25.49±3.96 | 3.23 -44.44 | 49.76±7.07** | 27.75 – 92.5 |
| Progesterone (ng/mL) | 0.88 ± 0.13 | 0.12 – 1.57 | 1.04 ± 0.17 | 0.26 – 1.90 |

** Significantly differ at p<0.01

prolapse, where the plasma 17ß-estradiol concentration was non-statistically increased than the values of pregnant control group(Ennen *et al.*, 2011).This indicates there exists hormonal influence in the pathogenesis of cervico vaginal prolapse. Concentration of estrogen will gradually increases during last 14 days before parturition. During the last 5 days, estrogen level will progressively increases at the rate of 248 pg/day (Henricks *et al.*, 2011).

The proposed mechanism for hormonal influence of cervico vaginal prolapse is expression of estrogen receptor alpha in the genital tract which will get increased during the last trimester of pregnancy. This accelerates the effect of circulating estrogen hormone resulting in cervico vaginal prolapse (Ennen *et al., loc cit.*). Under the synergistic effect of estrogen and relaxin, this mechanism of action will get accelerated and cause loosening of the supportive structures of reproductive tract (Hafez and Hafez, *loc cit.*).Thus concentration of estrogen during different stages of pregnancy positively correlates with the occurrence of cervico vaginal prolapse.

Cows with follicular cysts, especially those exhibiting extreme signs of nymphomania were more susceptible for cervico vaginal prolapse due to the alterations in their hormonal profile with low progesterone and high estrogen levels (De Kruif and Van Soom, 2009). This illustrates the role of estrogen in cervico vaginal prolapse.

Progesterone is an established myometrial blocker which prevents the myometrial contractions. Hence, it has an important role in prevention of cervico vaginal prolapse (Tandon, 2004). In this study, estrogen concentration of the prolapsed animals was higher than the control pregnant animals but progesterone concentration was not. Therefore, the preventive action of progesterone was not enough to neutralize the effect of estrogen, because estrogen is known to cause electromechanical events with rhythmic bursts of regular spike potential by causing sudden opening of calcium channels in myometrium. This ends up in the change in polarity from -90 mv to -45 mv. Moreover, estrogen being anabolic and mitogenic it positively regulates the synthesis of actin and myosin to increase the contractibility. All these proposed events are said to be initiated in the later part of last trimester of gestation to prepare for parturition.

The other factors influencing the occurrence of cervico-vaginal prolapse were concentration of relaxin hormone, intake of feed materials with phytoestrogen compounds, obesity and changes in collagen metabolism (Kahn, *loc cit.*).In the present study, influence of these factors in occurrence of cervico-vaginal prolapse were not taken into consideration. Upto authors knowledge this was the first study to assess the changes in plasma concentrations of estrogen and progesterone hormones during pre-partum cervico vaginal prolapse in *Bos indicus* cattle. Further research can be done to explore the bio-molecular basis of estrogen action during cervico vaginal prolapse in cattle and also to identify the molecular mechanism of action for the above said factors.

## Summary

Cervico-vaginal prolapse mainly occur during the last trimester of pregnancy due to synergistic action of various factors during that period. Among different factors hormonal influence on occurrence of cervico-vaginal prolapse predominates. Estrogen concentration has positive correlation with cervico-vaginal prolapse. Further, molecular basis of estrogen action

during this condition can be identified to support this increased concentration.

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# Popularization of Nandanam Broiler Chicken-3 in Tiruvannamalai District and Study on its Weight Gain in Different Systems of Rearing

**C.Theophilus Anand Kumar, C.M. Jaikanth[1] and R. Durairajan**

Veterinary University Training and Research Centre, Tiruvannamalai – 606 604, Tamil Nadu.

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**Abstract**

A total of 150day old Nandanam chicks -3 were randomly divided into three groups of 50 chicks per group, based on body weight viz., free range, deep litter and cage system of rearing and given to six farmers (25 birds to each farmer). All the birds were fed with concentrates till 8th week. The free range group birds were given grains from the 8th week onwards along with mash feeding, twice a day while in other two groups concentrate was fed as per the requirement. The body weights of the birds were recorded on alternate weeks, till 14th week. On 8th week, the feed conversion ratio(FCR) was 2.75.There was no significance difference in the weight gain of birds between free range, deep litter and cage system; Inferring that the Nandanam- 3 could be reared in free range system of rearing to achieve good FCR and profit to the stakeholders.

[1]*Corresponding author* : Email : vutrctvm@tanuvas.org.in

**Key words:** Nandanam Broiler Chicken-3, Rearing Systems, FCR

Nandanam broiler chick - 3 is the latest colour broiler cross variety developed byPoultry Research Station (PRS), Madhavaram.Thisbroiler varietyisupgraded to rearas backyard poultry in contrast to the broiler chicken which can be reared only in an intensive form of rearing. An effort was made to study the probable weight gain of birds in three systems of rearing viz., free range, deep litterand cage system of rearing. This extension research programmewas to popularize the Nandanam Chicken-3 variety at field level which can serve as an excellent aid to farmers in their backyard rearing along with the native chicken rearing.

**Materials and Methods**

A total of 150numbers of one day old Nandanam chicks were procured from Poultry Research Station(PRS), Madhavaram and were randomly