

Relationship between hormonal change and ovarian cyst in buffalo

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Abstract

The study revealed high percentage in infection with follicular luteal ovarian cystic (12%, 9.5%). Also found significant differences at ($0 < 0.5$) level in estrogen concentration between luteal cystic and control group and mathematic differences between follicular cystic and control group (138.8 ± 16.8 , 91.1 ± 6.9 , 162.5 ± 28.5). the study showed significant increase in progesterone in luteal cystic compared with follicular cystic and control group as below (21.4 ± 3.8 , 114.0 ± 9.27 , 28.8 ± 509) respectively .It is recorded significant decrease in LH concentration in luteal cystic and follicular cystic compared with control group as below (5.7 ± 1.2 , 6.73 ± 1.8 , 17.6 ± 2.1) respectively .It is showed no significant different between luteal cystic and follicular cystic compared with control group in FSH concentration as below (3.2 ± 0.3 , 3.2 ± 0.19 , 3.4 ± 0.3) respectively . Also did not recorded any differentiation in insulin concentration between follicular cystic and luteal cystic compared with control group (9.72 ± 4.10 , 5.52 ± 1.32 , 509 ± 0.83) respectively . The study show high level in cortisol in follicular and luteal cystic compared with control group as below (65.51 ± 4.35 , 87.98 ± 4.63 , 93.28 ± 2.78) respectively.

Key words: Buffalo, Hormones, Ovarian, Cyst and Infertility

INTRODUCTION

Buffalo in Iraq constitute an important part of the animal wealth (21.1%) because of the availability of food sources to the community of milk and dairy products and red meat and leather industries in the country, so should pay attention to this wealth and development and follow the scientific methods in breeding and benefit from the products of food and industry and the most important aspects of breeding is to provide Reproductive care and increased birth rates (1). Buffalo breeding is an extremely intensive industry and animals that fail repeatedly in the reproductive process are disposed of because the relationship between maintaining the cow and its production becomes non-viable (2). He said that these problems cost the educator about 10% of his annual income. This has led researchers to find out about some of the reproductive problems experienced by buffalo, where 3-6% of annual estrangement and exclusion is due to causes of reproductive system (3, 4). Among these problems are reproductive, ovarian cystic disease, which is considered an important ovarian disease and a major cause of the failure of reproduction in buffalo 46, as the infection of buffalo with this disease may lead to exclusion of the lack of reproductive efficiency in the near and long term and this can affect production with varying degrees of intensity, Including the breadth of pregnancy and pregnancy, and can cause economic losses for the breeder, lower pregnancy rate in the first vaccination and increase the number of vaccinations per pregnancy (5). Cystic ovarian disease is generally known to have one or more follicular or lutein structures on the ovary where the diameter is less than 2.5 cm and will continue on the ovary for at least 10 days in the absence of the yellow body (6). The ovarian cystitis disease is divided into three types or cases that are either vesicular, which occurs in mature ovarian follicles, or is yellowish, which is a parasite in the

wall of the dominant vesicles, or that occurs in the tissue of the body yellow (7). The study attempted to achieve the following objective a) Estimation of the incidence of ovarian cyst in domestic buffalo. b) Study the changes in the hormonal parameters associated with ovarian cystic (LH, FSH, Insulin, Cortisol, PGF2a, E2, P4.)

MATERIALS AND METHODS:

Animals study:

The research was carried out on 200 buffalo in the Qadisiyah province massacre from the period 2017-9-21 until 20-3-2018. The ages of the cows that were slaughtered ranged from 1.5 to 11 years depending on the method of teething. The animals of the study were divided into three groups depending on the type of cages, taking into account the age of the animals slaughtered in the massacre. There were three groups, including healthy animals and animals infected with two types of lactation

Collect blood samples

Blood samples were collected from immediately after slaughtering from the vena cava and placed in test tubes and then placed in a centrifuge for 15 min at 3000 rpm. The serum is then withdrawn and kept at -20°C until the time of the hormonal analysis.

Hormonal measurements

Samples of 20-C preserved preservatives were transferred to the laboratory for analysis of samples to measure the level of estradiol, lutein, follicle stimulating hormone, insulin hormone, cortisone hormone, and prostaglandins hormone. In each serum sample, ELISA was used, Under the steps indicated by the company fitted to each hormone

Statistical analysis

The statistical program SAS 20 (2012) was used to analyze the results by using the mean and standard deviation ($SE \pm Mean$). The Duncan test was also used to analyze the differences between main and secondary groups.

Table 1 shows the prevalence of polycystic ovaries in buffalo

Incidence rate	6.5 and above	(6-4)	(1.5- 3.5	NO.infected ovaries	
%12.5	6	18	1	25	Follicular cyst
%9.5	5	7	7	19	Luteinain cyst

Table 2 shows the comparison of hormonal changes between the two types of ovarian cyst and hormonal changes for each one with the control group.

Cortisol	PGF2 α	Insulin	FSH	LH	P4	E2	
93.28 ^a ± 2.78	169.21 ^b ± 13.4	5.9 ^a ± 0.83	3.2 ^a ± 0.19	6.73 ^b ± 1.8	21.4 ^b ± 3.8	138.86 ^{ab} ± 16.8	Follicular cyst
65.51 ^b	269.53 ^a ± 12.3	9.72 ^a ± 4.10	3.4 ^a ± 0.3	17.6 ^a ± 2.1	28.8 ^b ± 5.9	162.80 ^a ± 28.5	Healthy follicles
87.98 ^a	188.09 ^b ± 25.8	5.52 ^a ± 1.32	3.2 ^a ± 0.3	5.7 ^b ± 1.2	114.0 ^a ± 9.27	91.1 ^b ± 6.9	Lutein cyst

-Similar letters represent no significant difference at (p0.05)

-Different characters: There is a significant difference at (p0.05)

-Values represent the mean + standard errorChanges in estrogen levels

RESULTS AND DISCUSSION

Percentage of domestic cattle infected with polycystic ovaries.

The results of this study, which included 200 domestic cows with high rates of polycystic ovaries, showed that the percentage of follicular and lutein (12.5% and 9.5%) respectively, according to Table (1) (7). The difference in incidence may be due to weather conditions surrounding the buffalo, which directly affect the activity and effectiveness of the ovaries and the endocrine system, as indicated by(8). The effect of the season was clear on the secretions of the pituitary gland and ovaries. These percentages were lower than reported (9) in the study of the herd of multiple-born cattle and polycystic ovaries, and may be the cause of this difference, the age groups taken in the study, the category most affected by this disease are those between the ages of 3-6 Years, as pointed out that (10) as this category of age is in a state of high productivity for the number of births and the production of milk and this is an imbalance in the balance of negative energy, which in turn loses the buffalo a large part of the energy reserves of the body, especially the chemical and fat and proteins to make up For the lost energy to produce milk and maintain the body MAB Birth counts. Differences in results can be explained by differences in diagnostic methods, times and criteria in COD diagnosis, and other factors such as strain, age, nutrition, season, and lactation period

According to Table (1) the occurrence of lutein and follicular calcification in all ages and in different statistical rates, in contrast to what was indicated by (3) in his study to the occurrence of lutein calcification in older age, was in larger proportions, and this may be due to different diagnostic methods that determine the type Infection, competition for resources between older and younger cattle, nutritional management, level of production, early postnatal care differentials, or the exclusion and slaughter of large cattle all make the incidence of infection uneven .

Hormonal variables:

It was observed in Table (2) that the hormonal parameters of the two types of require were similar, except for the

differences between the concentrations of estrogen and progesterone that are associated with the type of pollen. This is indicated by(6), where the two types are due to the same hormonal disorder.

The results of Table (2) showed significant differences at (p0.05) between estrogen concentrations in the serum of the lesions infected with lutein toxin with the control group (sound) and the difference between the estrogen concentration in the serum of buffalo infected with follicular and intact dystrophy where the mean (22), (13), where they proved that thermal stress damages granular cells and sacrificial cells, resulting in poor secretion of steroids, A malfunction of the hormonal control, a hypothalamus-pituitary-ovarian axis, as well as tav These results were found to be correlated with the reduction of estrogen due to the transfer of cattle from one place to another. This increases cortisol, which inhibits estrogen concentrations, thus affecting the amount of LH required for ovulation

The reason for the lack of estrogen to increase the required rates is the poisoning and explosion of granular cells as shown in Figure (6), which is affected by some of the vehicles resulting from the negative energy balance (NEB), which occurs after birth due to poor feed to cattle, and increased requirements in the body of the buffalo to produce This increases the concentrations of free fatty acids (NEFA) in the blood, which in turn adversely affect the ability of granules to produce estrogen. The follicles collected in this study can be in the non-productive stages of steroid hormones .

The results of this study did not agree with the findings of most researchers who confirmed that follicular embolism is characterized by increased estrogen in the serum of polycystic ovaries (14), (15), (16), confirming in their studies that estrogen increases due to follicle stimulating hormone (FSH)), The presence of moderate progesterone ratios and the presence of persistent ovarian follicles, which have a greater number of LH receptors in the granule and the sacral cells, this mechanism may enhance the production of follicle androgen, leading to increased estrogen production as indicated (17) .

Changes in progesterone levels (P4)

The study showed a significant increase in the concentration of progesterone at $p < 0.05$ level in the blood serum of cows infected with lutein. The level of progesterone in the serum of the buffalo for cases of disease (follicular and lutein calcification) as well as control group, table (2) The standard error (21.4 ± 3.8 , 114.0 ± 9.27 and 28.8 ± 5.9) respectively, and these results are consistent with (13)(16). They noted that this type of calcification occurs when ovulation fails, and the cells of the prey are exposed to luteinization, And start the production of progesterone, as noted ((11)increase concentrations of progesterone with an increase in the wall Pray, and has not had a special study Baltkis considering that luteinizing this kind is a form of cystic fibrosis ((31)and user treatment when the injury is one (21).

The study showed that the concentration of progesterone in the blood serum of lactose-infected buffalo according to table (2) was consistent with the criteria set by (12), (23), (1 ng / ml) as a clear diagnostic mark for lutein , Due to the high concentration of progesterone in the lutein formations and the decrease in the rate of formation of calcification to decrease the conversion from progesterone to estrogen in the ovarian cells, because of the inhibitory work of nitric oxide on the enzyme (aromatase) This is referred to in his study on women with PCOS.

The values of progesterone concentrations differed in this study, with (24)(34) finding that different levels of progesterone may cause vesicles and ovulation at low and medium levels of the hormone. The reason is that the abnormal proportions of progesterone concentrations, Is that each tick follows a certain path to its formation, survival and decay, and that many of the polycystic is not consistent with simple classifications, and perhaps the physiological incompatibility between the hormones estrogen and progesterone in the blood serum of cows after birth gave rise to calcification and as shown in Figure (1).

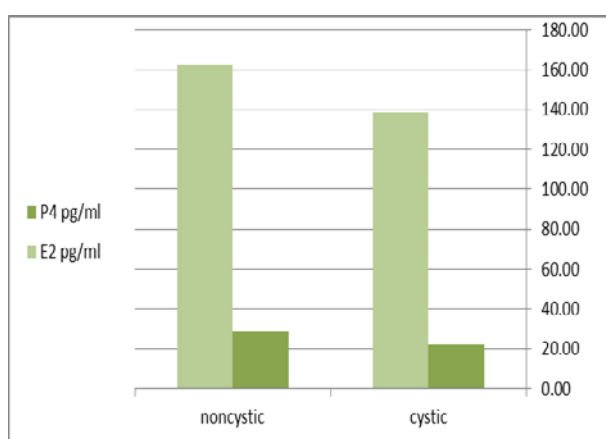


Figure 1 shows the physiological relationship between the two hormones (E2, P4) in infected and intact buffalo.

Changes in ovulation hormone levels (LH)

The results in Table (2) showed significant differences in the concentration of LH at $p < 0.05$ in healthy buffalo serum

and decreased levels of hormone concentrations in both cases (lutein and follicular calcification). The concentration of LH (17.6 ± 2.1 , 1.8 ± 6.73 and 1.2 ± 5.7) respectively. The results in this study were consistent with (25)(26), which was found to be low in lutein due to decreased estrogen in the serum of buffalo And explained that the stress leads to an increase in the secretion of cortisol hormone from the adrenal gland and this inhibits LH receptors , Which leads to lower levels of estrogen, poor feedback and the effect of estrogen under the hypothalamus and the hypothalamus, the reduction of lutein and the occurrence of bronchitis, and this explanation is closest to what happens in domestic cattle infected with ticks as well as the harsh conditions in which they live and shown in Figure 1

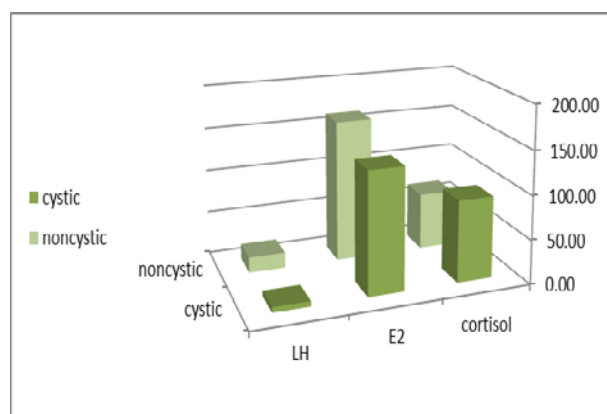


Figure 2 shows the relationship between cortisol and E2 (LH) in infected and healthy buffalo

The results of LH concentrations differed from (27)(25), which was highly correlated with estrogen and LH hormones, with an increase in the concentrations of LH from the control group. This increase was observed when injections infected with tetracycline benzoate were injected, He concluded that there is a positive correlation between the increase in estrogen and the flow of the hormone level (LH), but there is a dysfunction in the (LH-R) in the tissues of the ovaries prevents the rise of concentrations of LH before ovulation, may be due to low concentration of LH before ovulation to a few E2 concentration due to the toxicity of granular cells produced by this hormone by some fatty acids (NEFA) resulting from negative energy balance in the cow's body because buffalo do not have sufficient food to meet their daily needs.

Changes in levels of follicle stimulating hormone (FSH)

The results of the study showed no significant differences in follicle stimulating hormone (FSH) levels at a significant level ($p < 0.05$). FSH values were found in healthy buffalo serum with follicular and lutein (3.4 ± 0.3 , 3.2 ± 0.19 , 3.2 Respectively, and these results were consistent with those found (17), (27). He confirmed that follicle stimulating hormone (FSH) decreased with high levels of estrogen, which is indicated (28) that there is a negative correlation between levels of estrogen And the placenta on the one hand, and hormone follicle on the other, while these values differed on the hormone follicle stimulating study with

(29), which found a rise in the level of FSH, citing this That the hormone stimulating follicles was not affected by the hormonal disorder unless it is inhibited by the rise of estrogen and lactose and continue to excrete from the pituitary gland with increased receptors in granular cells

The current results confirm and support the findings of researchers that the hormonal regulation of FSH is linked to the levels of lactation and estrogen reverse, and therefore we see from this study that the proportion of estrogen was insufficient to induce the hypothalamic-pituitary axis of the superiority of the hormone follicle significantly for follicular or luteinosis and circumstances may affect The FSH is also affected by the quality of feed given to cows through insulin levels and IGF-1 levels that stimulate the growth and increase of FSH receptors in granular cells. The current results confirm and support the findings of researchers that the hormonal regulation of FSH is linked to the levels of lactation and estrogen reverse, and therefore we see from this study that the proportion of estrogen was insufficient to induce the hypothalamic-pituitary axis of the superiority of the hormone follicle significantly for follicular or luteinosis and circumstances may affect The FSH is also affected by the quality of feed given to buffalo through insulin levels and IGF-1 levels that stimulate the growth and increase of FSH receptors in granular cells.

Changes in levels of insulin hormone

The results of the study and according to Table (2) showed no significant differences in serum insulin concentration in infected and intact buffalo. It was observed that there were differences in the concentration values of the two patients from the control group. The insulin concentrations in the follicular and lutein, (5.9 ± 0.83 , 5.52 ± 1.32 , 9.72 ± 4.10), respectively. The results were consistent with(30), (31, and(26). In their studies, they found statistically significant differences between healthy and infected cases. However, (32)found a significant decrease in the level of insulin in the blood of infected buffalo. For postnatal buffalo, and the imbalance of their energy and protein content, which causes the insulin hormone to decrease as indicated by (3)(18) as insulin stimulates cell proliferation, increased activity and production of steroids

The results of the study on insulin levels differed with(6), which found that insulin concentrations in eugenal serum did not have a morphological effect on ovarian cells and were inversely associated with estrogen. This difference was due to the use of different diagnostic methods among species, .The exact changes in vesicle morphology are not resolved by optical microscopy. The reason for the low insulin hormone in this study may be due to increased NEFA concentrations in the blood of infected buffalo. In his study on buffalo, (24)noted that insulin is low in NFA concentrations For several types of feed Including the β -cells found in the pancreas. The decrease can also be caused by the lack of insulin secretion due to the increase in the formation of glucose (glycogenic) in the liver due to the rise of ketones resulting from the destruction of large amounts of body fat to cover the energy needs. Insulin before ovulation will lead to dysfunction of the ovarian tissue and thus lose its ability to secrete (CYP19A1 =

Aromatase) which converts the androgen into estrogen in the granule cells, which is important in the occurrence of ovulation and can observe the relationship between insulin and estrogen as shown in Figure 2 :

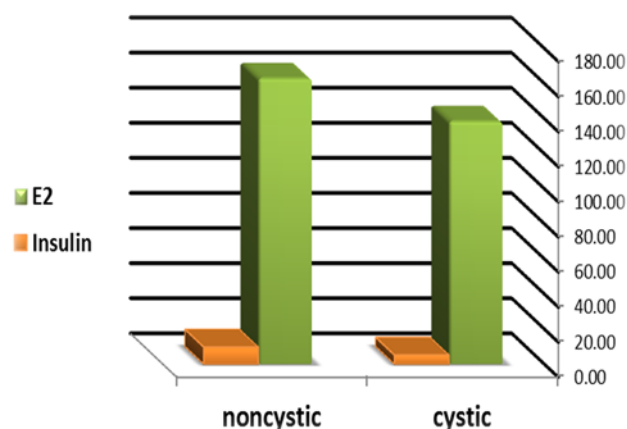


Figure 3 shows the relationship between insulin and estrogen in serum infected and intact animals

Changes in levels of the hormone prostaglandin (PGF2 α) The results of this study showed that concentrations of the hormone Prostaglandin (PGF2 α) in the healthy buffalo serum was higher below the level of significance ($p < 0.05$) as the concentrations of the hormone in the serum of buffalo infected with PCOS, reaching values (269.53 ± 12.3 and 169.21 ± 13.4 and 188.09 ± 25.8), respectively, did not address the previous studies of the values of this hormone causally to the occurrence of the disease, but was used as a treatment to remove clotting and resumption of ovarian activity to produce follicles, because it has the ability to reduce the flow of blood to the tissues of Lutein, and thus decay, as well as inhibiting progesterone, Its therapeutic effectiveness is not affected by its receptors Of the pituitary gland and the ovaries occurrence of cystic ovarian (33)(20).

Changes in concentration levels of cortisol

The values of concentrations of cortisol in the serum of buffalo infected with follicular and lutein cyst were higher than the control group (healthy cows) at a significant level ($p < 0.05$), reaching the mean \pm standard error (93.28 ± 2.78 , 87.98 ± 4.63 , 4.35 ± 65.51)) Respectively, and these results were consistent with what (24) demonstrated the hypothesis that high concentration of cortisol associated with postpartum uterine inflammation (the period during which the uterus is susceptible to bacterial infections) causes the collapse of the mechanism of the dominant nerve endocrine on ovulation inbuffalo, and the results were close to the conclusion (28), which showed that stress causes high cortisol, which inhibits the action of the hormone Lutein, thus causing polycystic ovaries, through increased fat metabolism and high levels of beta-hydroxybutyric acid and NEFA, as noted (28) and this is consistent with the results This study, shown in Table (2), is shown in Figure 4.

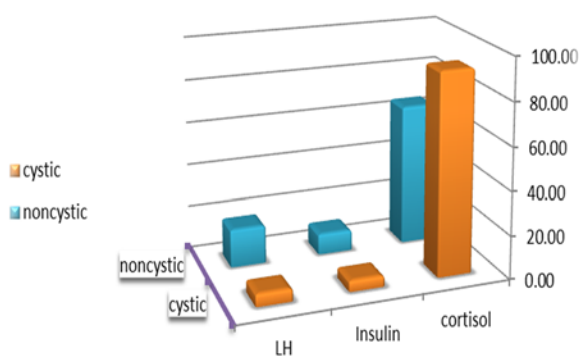


Figure (4) shows the physiological relationship between cortisol hormone on the one hand and hormonal insulin and LH on the other hand.

The reason for the increased cortisol is the lack of calcium that is exposed to the buffalo after birth through the production of milk and sustain, and this is referred to (15), especially in the summer I. Also, these results indicated that there is a correlation between the high cortisol and low levels of insulin, As shown in Figure 4, this association may show us the causes of insulin decline in the period of restoration of ovarian activity and the production of new follicles will be. The results of the study differed with what (35) found. There was a significant decrease in the concentrations of cortisol in serum infected with PCS. This was attributed to the weakness of the postpartum immune system, which causes an increase in cortisol, as indicated by (22), caused by poor nutrition during postpartum and production period.

Since the study was conducted on buffalo and through the hormonal changes described above, we can summarize them by two main steps:

1-Which is characterized by adapting to the nutrition on the poor quality of the relationship with the absence of pasture as well as the high temperature that generates strains on the animal affects the hormone stimulated adrenal gland Adrenocorticotropic hormones, which affects the hormone cortisol and then reduce the secretion of the hormone Gonadotropic releasing gland Hormones from the hypothalamus, which in turn lead to reduce the secretion of the hormone (ovulation) (Luteinizing hormones, and thus the incidence of bronchitis), (33).

2-The levels of steroids in the serum of cows infected with ovarian cyst represented by estrogen and progesterone along with insulin levels and morphological changes in the vesicular wall give a precise description of the classification of ovarian capsules in the ovaries, because insulin and insulin-like factors play a key role in the final stages of the development of the follicle, It can be predicted that the abnormal levels of these metabolic hormones disrupt the vesicles functionally, and end with decay or inflammation.

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