Assessment of prolactin hormone and some biochemical profile in normal and inactive ovaries in Iraqi Holstein cross breed cows

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Abstract

The present study carried out to estimate of prolactin hormone and some biochemical profile in normal and inactive ovaries in Iraqi Holstein cross breed cows. Forty Iraqi Holsten cross breed cows were used in this study (30 cows suffer from inactive ovary and 10 normal cyclic cows) aged between 6-8 years in Salah-din province. Cows suffering from inactive ovaries diagnosed by rectal palpation (small, smooth round ovaries) in period more than 60 days post-partum. Blood samples were collected from each animals from jugular vein and isolate the serum for estimate of prolactin hormone and some biochemical parameters (Total protein, Triglyceride, cholesterol and Glucose). The analysis was carried out in the laboratory of clinical pathology/ college veterinary medicine/ Tikrit University. The results of the current study did not showed significant differences in the levels of the prolactin hormone in the cows suffered from inactive ovaries (0.11 ± 0.002 ng/ml) compared with the healthy cows (0.12 ± 0.06 ng/ml). The results of biochemical parameters showed that the average level of total protein and triglycerides was significantly lower (P≤0.01) in the blood of cows with inactive ovaries compared with their levels in healthy cows, while the level of cholesterol was significantly elevated in the cows suffered with inactive ovaries compared to its level in the blood of healthy cows. While there was no significant difference in the level of glucose.

In conclusion there is no effect for the prolactin hormones on the occurrence of inactive ovaries in cattle and the biochemical parameters are considered important marker for normal status of reproductive performance in cattle.

Keywords: inactive ovary, biochemical, prolactin, anestrus.
Introduction:

Inactive ovary is one of Reproductive disorders in which the ovaries are quiescent without signs of cyclicity (Zulu et al., 2000). Most of the dairy cows resume ovulatory estrus cycle within 15–45 days postpartum (Forde et al., 2011). Cow must be bred successfully within 80-85 days postpartum to achieve the desired calving interval of 365 days (Khan et al., 2010). Infertility due to cyclicity failure or anestrus has great economic impact leads to economic losses through increased inter-calving interval, poor net calf crops, production loss, treatment expenses and cost of replacing mature animal with first calving heifer (Kumar et al, 2014). The rate of inactive ovaries ranged approximately from 12 to 46 % (Hussein et al. 1992) . About 20% of dairy cows in anestrous by the start of breeding programs (Rhodes 2003), or by 63-d after calving (Santos, 2004), were suffering from the inactive ovary (Mohammadsadegh, 2019).

Average milk production in dairy cows has increased dramatically over the past decades and these increases in milk production combined with an increase in the incidence of metabolic and reproductive disorders (Opsomer et al., 2000) High milk production is considered one of the most important reasons for the occurrence of reproductive disorders after birth, such as polycystic ovary disease, delayed ovulation, and decreased severity of estrus signs (Lucy et al. 2001). Nutrition has an important roles for normal animal health and reproduction (Singh et al., 2017), as the nutritional deficiency leads to a decrease the animal weight and lead to disturbances in the work of the endocrine glands, which result in fertility problems in the animal (Perez-Marin et al., 2012). blood Biochemical levels gives good diagnostic picture for metabolic disturbance in animals. Blood total protein, cholesterol and glucose have essential role on reproductive cyclicity and fertility in female animals (Park et al., 2010). Disturbance in these components may lead to decreased reproductive performance in animals. Puppel and Kuczyriska, (2016) reported significant changes in blood energy metabolites in lactating cows suffering from anestrus caused by inactive ovaries such as glucose, total cholesterol, Serum total proteins and blood urea nitrogen.

Therefore for the present study aimed for estimate prolactin hormone and some of blood biochemical profile in normal and inactive ovaries in Iraqi Holstein cross breed cows.
Material and methods

Animals study: The study was carried out in a number of Salah al-Din province from 5/10/2020 to 30/4/2021, Forty Iraqi Holsten cross breed cows were used in this study (30 cows suffer from inactive ovary and 10 normal cyclic cows) aged between 6-8 years in Salah-din province. Cows suffering from inactive ovaries were diagnosed by rectal palpation (small, smooth round ovaries) in period more than 60 days post-partum.

Blood samples collection:

Blood samples (10 ml) were collected from each animals from the Jugular vein then for 15 minutes at room temperature and placed in centrifuge at 3000 rpm for 10 minutes for isolate serum. All serum samples were kept at -20 until the biochemical tests were performed.

Biochemical and minerals estimation:

The biochemical and minerals were estimated in the laboratory of clinical pathology/ collage veterinary medicine/ Tikrit University. The concentration of prolactin concentration were measured by Enzyme Linked Immuno-sorbent Assay by aspicial diagnostic commercial kit (Medix Biotech Inc.,CA). Total proteins, Triglyceride, cholesterol and Glucose were measured by spectrophotometer with special kit BIOLABO Company (France) as described by (Tietz, 2006).

Statistical analysis

The data of present study were analyzed by using paired t-test (a Repeated Measures ANOVA) by SPSS program (Version 19) and the differences were set at p < 0.05 (Al-Mohammed et al., 1986).

Results:

The results of the current study, as shown in Figure 1, showed that there was no significant difference in the average level of the prolactin hormone in the blood serum of cows suffered from inactive aviaries and healthy cows, which amounted to 0.11 ± 0.002 ng/ml and 0.12 ± 0.06 ng/ml, respectively.
The results of the current study, as shown in Table 2, showed that the average level of total protein and triglycerides was significantly lower (P≤0.01) in the blood of cows with inactive ovaries (3.15 ± 0.09 g/dL and 50.63 ± 2.29 mg/dl respectively) compared with their levels in healthy cows (4.61 ± 0.37 g/dL and 83.70 ± 3.83 mg/dL respectively), while the level of cholesterol was significantly elevated in the blood of cows infected with inactive ovaries (170.80 ± 9.53 mg/dL) compared to its level in the blood of healthy cows (76.60 ± 5.36 mg/dL). While there was no significant difference in the level of glucose in the blood of cows infected with inactive ovaries and blood of healthy cows (55.23 ± 2.19 and 58.30 ± 5.63 mg/dL, respectively).

Table 2: levels of total protein, triglycerides, cholesterol and glucose in the blood of inactive ovaries and healthy cows (mean ± standard error).
- Triglycerides (mg/dl) 50.63±2.29  83.70±3.83  <0.0001**
- Cholesterol (mg/dl) 170.80±9.53  76.60±5.36  <0.0001**
- Glucose (mg/dl) 55.23±2.19  58.30±5.63  0.54 (N.S)

** significant differences (P<0.01).
* significant differences (P<0.05).
N.S no significant differences

Discussion:

High milk production is considered one of the most important reasons for the occurrence of reproductive disorders after birth, such as polycystic ovary disease, delayed ovulation, and decreased severity of estrus signs (Lucy et al., 2001). Despite that, the results of the current study showed that there was no effect of the level of the hormone prolactin in the blood of the cows under study in the incidence of ovarian inactivity, as there were no significant differences between the level of the hormone in the blood of cows infected with inactive ovaries compared to its level in the blood of healthy cows. This is consistent with what was reached by (Pahwa and Pandes 1984), where they did not notice any significant differences in the level of the hormone prolactin in the blood of female buffaloes that were suffering from lack of estrus with its level in the blood of healthy females.

The results of the current study showed a significant decrease in the level of total protein in the blood of cows suffering from inactive ovaries compared to its level in the blood of healthy cows, and this is consistent with what was reached by (Mondal et al. 2019) in Bengal striking cows and (Pariza et al. 2013) in Zibo cows and (Singaram and Jacob 2017) in Jersey cows, as the results of this study agreed with (Abd-Alrazeq and Allam 2019) and (Butani et al. 2011) in female buffaloes, and this is due to its close relationship With a decrease in the essential amino acids required for the synthesis of both gonadotropin and gonadotropin hormones, and as a result, an irregularity occurs in the reproductive hormones leading to inactivity of the ovaries (Arosh 1998). In contrast to these results, (Ahmad et al. 2004) found a significant increase in the level of The total protein in the blood of cows infected with inactive
ovaries compared to its level in the blood of healthy cows, while these results did not agree with the findings of the researchers (Bohara and B. Devkota 2009), where they did not find a significant difference in the level of total protein in the blood of both female buffaloes infected with inactive ovaries and healthy females, and the reason for this may be due to the difference in the animal’s breed or type, feeding system and geographical location.

Triglycerides are one of the most important fats found in adipose tissue, which represents a high store of calories for energy compared to protein and glycogen in dairy cows. Eating large amounts of energy above the animal’s needs leads to an increase in fat storage in the body, and this energy can be used when the need for energy increases. Energy consumption, especially during postpartum milk production (Gross et al. 2013). The results of the current study showed a significant decrease in the concentration of triglycerides in the blood of cows suffering from inactive ovaries compared to its level in the blood of healthy cows. This is consistent with what was found (Lucy et al. 1992), which indicated that feeding animals with a high percentage of fat helps to improve the reproductive efficiency of cows by improving the development of follicles and ovulation. The reason for the decrease in the level of triglycerides in the blood of cows suffering from inactive ovaries compared to its level in the blood of healthy cows is due to the poor quality and value of food.

The results of the current study showed a significant increase in the blood of cows that were suffering from inactive ovaries, compared with a decrease in its level in the blood of healthy cows, and this result is consistent with what was found by (Pathan et al. 2011) in Striking Holstein cows. The reason for this may be due to a decrease in the consumption of cholesterol, which is a raw material for the manufacture of steroid hormones necessary for the initiation of ovarian activity (Pathan et al. 2011). Where cholesterol is an important and essential fat for the synthesis of steroid hormones in the testes, ovaries and adrenal cortex (Butani et al. 2011). The result of the current study did not agree with the findings of (Singh et al. 2006) and (Ahmad et al. 2004) in cows, (Abd El-Razek and Allam 2019), (Kumar et al. 2007) and (Yadav et al., 2006). In female buffaloes, they did not find any significant difference between the level of cholesterol in the blood of females suffering from inactive ovaries compared to its level in the blood of healthy females. The reason for this may be due to the difference in type, breed, feeding regime, season and geographical location.
The results of the current study showed that there was no significant difference in the level of glucose in the blood of cows suffering from inactive ovaries compared with its level in the blood of healthy cows, and this is consistent with the findings of (Singaram and Jacob 2017) and (Ahmad et al. 2004) in cows, While the study did not agree with the findings of (Abd-Elrazeq and Allam 2019) in buffaloes, it was found that there was a significant decrease in the level of glucose in the blood of buffalo females suffering from inactivity of the ovaries compared to its level in the blood of healthy females, and the reason for this may be due to different animal species.

In conclusion there is no effect for the prolactin hormones on the occurrence of inactive ovaries in cattle and the biochemical parameters are considered important marker for normal status of reproductive performance in cattle.

REFERENCES


