

Postpartum reproductive performance and blood parameters of Egyptian buffalos treated with some hormones and propylene glycol, or their combination

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ABSTRACT

This experimental work aims to evaluate the efficacy of supplying prostaglandin F_{2α} (PGF_{2α}) and gonadotropin-releasing hormone (GnRH), propylene glycol (PG), or their combination on reproductive performance and some blood parameters of postpartum (PP) Egyptian buffaloes. A total of 32 postpartum Egyptian buffaloes were divided into 4 groups. Buffaloes in group 1 (G1) had no treatment. Group 2 (G2) was injected with PGF_{2α} (at Day 0, calving day) and GnRH (At Day 15 PP). Animals in group 3 (G3) received oral doses of PG (300 ml) at 0-, 3-, 6-, 9-, 12- and 15-days PP. Animals in group 4 (G4) were given combination of G2 and G3 treatments. The results showed a significant improve in all reproductive traits of buffaloes treated with hormones, PG and their combination compared to the control group, exemplified with significant increase in blood total protein, albumin, globulin, total lipid, and cholesterol, and insignificant increase in triglyceride. The levels of creatinine and transaminases were decreased compared to control group. In conclusion, PGF_{2α} + GnRH treatment, PG treatment, or their combination improved the reproductive performance and blood parameters of the postpartum Egyptian buffalo.

Keywords: Egyptian buffalos, Gonadotropin-releasing hormone, Propylene glycol, Prostaglandin F_{2α}, Reproductive performance, Uterine involution.

INTRODUCTION

Buffalo produces about 60% of total produced milk in Egypt while the remaining 40% is produced from cattle because buffalos are the first choice of most Egyptian farmers. The reproduction efficiency is one of the chief factors of productivity and profitability of dairy animals. Such species is highly impeded by late attainment of puberty, and long postpartum anestrus, and calving interval (El-Wakeel et al., 2013). After the parturition, the reproductive axis functionally and structurally returns to start a new pregnancy cycle. So, the postpartum period represents a critical time. The postpartum anestrus is a real problem results in prolongation of calving interval (Badr 1998; Ganchou and Inskeep, 2008). One of the main sources of economical loss for buffalo breeders is extended postpartum absence of ovarian cyclic activity and absence of overt estrous signs. To achieve successful control of these two problems, further studies should be carried out to improve the reproductive performance during this critical period (El-Wishy, 2007).

Prostaglandin F_{2α} induces luteal regression in many species including buffalo, bovine, ovine, and equine. The luteolytic effects in the bovine have been well documented (Chenault et al., 1976; Lemley et al., 2021). Also, El-Desouky and Hussein (2015) reported that a

single over-dose of PGF_{2α} has an encouraging effect to confront the problem of postpartum typical anestrus in dairy cows, as well as the abrupt decrease in the serum progesterone concentration followed by enhancement of the ovarian activity.

The hypothalamic-pituitary-gonadal reproductive axis is mainly regulated by hypothalamic gonadotropin-releasing hormone (GnRH), which has many further functions because its receptors are widely distributed in both the central nervous system and peripheral tissues and organs (Hall and Hall, 2021; Maggi, 2016). GnRH and its analogues elicit the immediate production of luteinizing hormone (LH) and follicle stimulating hormone (FSH), resulting in high levels of these hormones in the peripheral blood for 3–5 h. Changes in LH and FSH excretion appear to reflect indirect GnRH-induced changes in the function of the corpus luteum (CL) or follicles. (Thatcher et al., 1993).

Propylene glycol is a glucogenic source that improves carbohydrate and fat metabolism in Egyptian buffalocows in early lactation period. PG is a glycogen precursor that is speedily taken in the rumen and converted to glucose (Nielsen and Ingvarsten, 2004). Propylene glycol quickly disappears from the rumen via three different routes including absorption, fermentation, or direct passage to the intestine. The most important ways in which PG can

disappear from the rumen are via absorption and fermentation because PG decreases the molar ratio of acetate to propionate in rumen volatile fatty acids (VFA). The PG decreases dry matter intake (Formigoni et al., 1996). The blood plasma level of β -hydroxybutyrate is significantly reduced by postnatal doses of PG (Butler et al., 2006). Therefore, the current research aims to evaluate the efficacy of PGF_{2 α} , GnRH, PG, or their combinations on postpartum reproductive performance and some blood components of postpartum Egyptian buffalos.

MATERIAL AND METHODS

The herein experimental work was performed at the Animal Production Research Institute (APRI), Agricultural Research Center, Ministry of Agriculture in cooperation with the Department of Animal Production, Faculty of Agriculture in Cairo, Al-Azhar University, during the period from December 2017 to August 2018.

Animals and experimental design

After parturition, we used a total number of 32 healthy Egyptian buffalos in this study. The buffalo cows (600 \pm 50 kg, 4-6 year old and 2-4 lactation seasons) were divided into 4 groups (8/each). Animals in the first group did not receive any treatment and were used as control group (G1). Buffaloes in G2 were injected intramuscularly after calving with 2.5 cm PGF_{2 α} then were injected intramuscularly with 2.5 cm GnRH on day 15. In G3, buffaloes received an oral dose of drenched 300 mL of PG dissolved in 3L of saline solution per animal at calving day (zero day), 3, 6, 9, 12 and 15 days later. Animals in G4 were treated with a combination between G2 and G3 treatments. The experimental buffalos were kept under the same conditions of housing, environment, and management.

Feeding system

All experimental buffalo cows received their individual feeding according to Kerly requirements for buffalo cows (Kearl, 1982). The diet consisted of concentrate feed mixture (CFM 60%), berseem hay (BH 20%) and rice straw (RS 20%). Feeds were offered at 6 a.m. and 5 p.m. after milking, while fresh drinking water and mineral blocks were available as a free choice.

The source and composition of chemical compounds

Propylene glycol was purchased from Alpha Chemicals Company, (Beheira, Egypt).

Prostaglandin F2 alpha (PGF_{2 α} ; Estrumate®) was manufactured by Essex Animal Health (Friesoythe, Germany). Gonadotropin-releasing hormone (GnRH; Receptal®) was acquired from Hoechst AG (Frankfurt, Germany).

Reproductive performance

All reproductive parameters were recorded as described by Ibrahim (2004). The reproductive parameters included the period from calving to drop of fetal membranes (DFM), uterine involution (UI), uterine horns symmetry (UHS), cervical closer (CC), first postpartum estrus (FPE), days open (DO) and number of services per conception (N/C).

Blood sampling

Blood samples were biweekly withdrawn from the jugular venipuncture in heparinized test tubes till the end of experimental period. Blood samples were then separated by centrifugation at 4000 rpm for 15 min to obtain blood plasma which was transferred to an Eppendorf tube and was stored in a deep freezer until subsequent biochemical analyses. Plasma samples were analyzed photometrically using spectrophotometer (JENWAY-6405 UV/Vis) and commercial kits to determine the concentration of total proteins (TP, Henry, 1964), albumin (Al, Doumas et al., 1971), total lipids (TL, Zollner and Kirsch, 1962), cholesterol (Ch, Richmond, 1973), triglyceride (Tr, Mc Gowan et al., 1983) and creatinine (Cr, Bartels et al., 1972). Activity of aspartate (AST) and alanine (ALT) transaminases were determined in blood plasma according to Reitman and Frankel (1957). The globulin was calculated by subtraction of albumin from total protein.

Statistical analyses

The statistical analyses were carried out using IBM SPSS Statistics (Version 20) predictive analytics software. Also, significant differences among means were determined by Duncan's multiple range test (Duncan, 1955) at a 5% level of significance to test the effect of supplying PG as supplemental energy, some hormonal treatments (PGF_{2 α} and GnRH), or both treatments on postpartum reproductive performance of Egyptian buffalos. Data were analyzed by one-way analysis of variance method using the following model.

$$Y_{ij} = \mu + \alpha_i + \epsilon_{ij}$$

Where Y_{ij} = the criterion measure on a randomly selected element (i) in treatment population (j), μ = the grand mean of treatment

populations, α_i = the effect of treatment (1:4), ϵ_{ij} = the experimental error.

RESULTS AND DISCUSSION

Reproductive performance

Drop of fetal membranes (DFM), uterine involution (UI), uterine horns symmetry (UHS), cervical closer (CC)

The effect of some hormones and propylene glycol, or their combination on some reproductive traits are presented in Table 1. The results indicated that all treated groups had lower levels of DFM, UI, UHS, and CC compared to the control group ($p < 0.05$). The lower levels of these parameters were observed in G4 among the other treated groups. These results indicated that all uterine involution parameters of buffalo cows were improved significantly in the treated groups compared to control group and the most improvement was observed in buffalo cows treated with PGF_{2 α} + GnRH + PG combination.

The present results of the time from calving to placenta drop agree with the findings of Solanki et al. (2019) and El-Hawary et al. (2020) who injected lactating Friesian cows with PGF_{2 α} and recorded a significant ($p < 0.05$) reduction in the time required for placenta drop.

The use of PGF_{2 α} increases uterine contractility with dilatation of the cervix, which promotes the effect of PGF_{2 α} on placental expulsion (Hafez and Hafez 2000). Patel et al. (2015) found that the injection of cows with 25 mg PGF_{2 α} after parturition reduced the time required for expulsion of the placenta in HF crossbred cows. The same author suggested that direct injection of PGF_{2 α} after parturition induces early expulsion for the fetal membranes.

In the present study PG treatment decreased the time required for expulsion placenta after parturition than control group. This trend was recorded in Egyptian buffalo heifers (Abdelhamid et al., 2017) and cows (Lien et al., 2010).

In the herein investigation, PGF_{2 α} accelerated the uterine involution in Egyptian buffalos during postpartum period. The significant decrease in the time required for return of uterus to its normal position is in concur with the results of Ingawale and Bakshi (2016) in Murrah buffaloes. In a previous study, Shah et al. (1990) found that the treatment of Nili-Ravi buffalos with a single intramuscular injection of 100 μ g

gonadotrophin releasing hormone (GnRH) or 250 μ g GnRH on day 14 post-partum reduces the time required for complete uterine involution. Moreover, Meziane et al. (2018) evaluated the effect of the GnRH induction of cyclicity in Holstein dairy cows during the postpartum period and found that 90 % of the treated cows possess a pelvic uterine position than the control ones. In this respect, Sharawy et al. (2015) found that cows treated immediately after calving with 625 μ g of a synthetic PGF_{2 α} or 20 μ g of GnRH analogue showed earlier uterine involution as compared to the control.

The same trend of PG treatment effect on uterine involution in the present study is reported by Abdel-Latif et al. (2016) who indicated a significant decrease in the time required to complete uterine involution of Egyptian buffalo heifers.

The significant reduction in the interval required to uterine horns symmetry and to complete cervical closure. Similar trend was observed in the Egyptian buffalo heifers treated for 8 weeks before delivery with PG significantly reduced the time required for symmetrical of uterine horns and closure of the cervix (Abdelhamid et al., 2017). These results agree with Abdel-Khalek et al. (2013) and El-Hawary et al. (2020) in Friesian cows. These trials indicated that the injection post-calving reduces the time required from parturition to uterine horns symmetry and cervical closure complete. On the other hand, Stephen et al. (2019) showed that the interval to complete the uterine horn symmetry did not differ significantly in Holstein cows treated with 25 mg PGF_{2 α} .

Postpartum first estrus (PPFE), days open (DO) and number of services per conception (N/C).

The effect of some hormones and propylene glycol, or their combination on some reproductive indicators are presented in Table 2. The results indicated that all treated groups had lower levels of PPFE and DO compared to the control group ($p < 0.05$). The higher levels of these parameters were observed in control group. Only, the number of services per conception is not affected by treatment but it showed insignificantly decrease in G4 than G2, G3 or G1. These results indicated that all reproductive indicators of buffalo cows were improved in the treated groups compared to control group and the most improvement was observed in buffalo cows treated with PGF_{2 α} + GnRH + PG combination.

The present results were in harmony with those of Ingawale and Bakshi (2016) who indicated that the treatment of buffalos with PGF_{2α} or GnRH post-calving reduced the average days required for exhibition to first postpartum estrus significantly compared with the control group. Meziane et al. (2018) and Abou-Aiana et al. (2019) showed that when cows treated with PGF_{2α} and GnRH after calving, the interval from calving to first estrus was reduced significantly ($p < 0.0001$) as compared to control group. Raut et al. (2016) reported that the administration of PGF_{2α} for dairy cattle during early postpartum period improved its fertility. Concerning the positive effect of PG on the interval from calving to first detected estrus, Nassef et al. (2019) reported that cows supplemented with PG showed the rapidly occurrence of first postpartum estrus than the controls.

The significant reduction in days open was in accordance with the results of Rede et al. (2016), who indicated that buffalos treated with PGF_{2α} had a significant reduction in the days open interval compared to control group. Abdel-Khalek et al. (2015) showed that the injection of primiparous Friesian cows with PGF_{2α} led to significant ($p < 0.05$) decrease in days open than control group. El-Malky et al. (2010) found that GnRH treatment reduce days open significantly ($p < 0.05$) by 28.3% in buffalos with retained placenta than non-treated group. The supplementation of PG to Holstein cows pre and postpartum significantly shorted days open as compared to the control group (Nassef et al. 2019).

On the other hand, Rudowska et al. (2015) reported that simultaneous administration of GnRH and PGF_{2α} to dairy cows had no effect on days open. Sharawy et al. (2015) found no significant difference in days open between the control cows or those injected with GnRH at postpartum period.

Data of the present study of number of services per conception were insignificantly low in G4 followed by G2 then G3 and finally G1. In this respect, Patel et al. (2015) and Solanki et al. (2019) showed that treatment of cows with PGF_{2α} immediately after parturition caused a non-significant decrease in the number of services per conception compared with controls. The presented results were in accordance with those of Sharawy et al. (2015) who found no significant difference in number of services per conception between the control group and cows received GnRH analogue at postpartum period.

On the other hand, El-Malky et al. (2010) found that the treatment of retained placenta buffaloes by GnRH reduced significantly ($p < 0.05$) the number of services per conception than those in non-treated group. Abou-Aiana et al. (2019) showed that the injection of Friesian cows with PGF_{2α} analogue after 1-2 hours of calving caused a significant ($p < 0.05$) reduction in the number of services per conception as compared with the control group. Recently Kumar et al. (2020) found that when the sub-estrus cows treated with PGF_{2α}, and true anestrus cows treated with GnRH the number of services per conception were decreased as compared with untreated anestrus cows.

Concerning the effect of PG on the number of services per conception, Nassef et al. (2019) stated that the supplementation of PG decreased significantly ($p < 0.05$) the number of services required for conception by 23.1% than the required in the control group. They also discovered that this could be due to a rise in blood glucose levels. It is generally recognized that raising blood glucose levels raises insulin hormone and insulin-like growth factors, both of which are beneficial to reproductive performance.

Biochemical and enzyme activity in blood plasma:

The effect of some hormones and propylene glycol, or their combination on plasma biochemical and enzyme activity are presented in table 3. The results indicated that all treated groups had higher concentrations of total proteins (TP), albumin (AL), globulin (GL), total lipid (TL), cholesterol (Chol), and triglyceride (TG) compared to the control group ($p < 0.05$). The higher concentrations of these parameters were observed in G4 among the other treated groups. The results also indicated that all treated groups had lower levels of creatinine, AST, and ALT compared to the control group ($p < 0.05$). The lower levels of these parameters were observed in G4 among the other treated groups. These results indicated that most plasma parameters of buffalo cows were improved significantly in the treated groups compared to control group and the most improvement was observed in buffalo cows treated with PGF_{2α} + GnRH + PG combination.

In general, among all treatments PGF_{2α} + GnRH + PG or combination (G4) reflected the best improvement in protein and carbohydrate metabolism, lipid profile, kidney, and liver function, of buffalo cows.

These results are in accordance with those of Abdul Ghaffar et al. (2018) who showed that serum total protein and albumin concentrations increased significantly ($p < 0.05$) in Nili-Ravi buffalo heifers supplemented with 300 g or 150 g PG per animal per day for 30 days mixed in routine ration as compared to control group. Kumar et al. (2018) found that postpartum anestrus cows treated with G-P-G protocol increased the serum total protein and albumin values significantly in comparison to controls. In this respect, Virmani et al. (2011) found that treatment of anestrus cows with OvSynch protocol (PMSG-GnRH-PGF_{2α}-GnRH) caused a significant ($p < 0.05$) increase in serum total protein and albumin levels as compared to their levels before treatment.

While Gabr et al. (2017) found no significant distinctions in plasma total proteins, albumin, or globulin in primiparous Egyptian buffalos treated with PG twice weekly during the late pregnancy and early lactation phase when compared to control animals. Dhamsaniya et al. (2016) showed that treatment of buffalos with 5 mL GnRH alone caused a non-significant ($p < 0.05$) increase in total plasma protein on the day of estrus when compared to control group. Pandey et al. (2015) showed that when repeat breeding crossbred cows given IM 10 µg GnRH on 5th day post breeding the concentrations of plasma total protein, albumin and globulin did not differ significantly ($p < 0.05$) in pregnant and non-pregnant animals of the same group on day 0, 5, 10, 15, and day 20 of estrous cycle. Adamski et al. (2011) showed that no significant differences in the concentrations of serum total protein and albumin in pre-partum and post-partum in Simmental cows supplemented with 300 mL PG from 7 days before birth until 21 days after birth in comparison to control group.

The significant increase in total plasma lipid and cholesterol, and insignificant increase in triglyceride concentrations are in accordance with those found by Chaudhary et al. (2019) who revealed that the mean serum total cholesterol levels significantly ($p < 0.05$) increased in Surti buffalos implanted with norgestomet ear implant for nine days along with injection of estradiol valerate on the day of implant insertion, additionally 500 µg cloprostenol (PGF_{2α}) was given IM on 8th day when compared with control group. Kumar et al. (2018) showed that when postpartum anestrus cows treated with GPG Protocol (GnRH-PGF_{2α}-GnRH regimen) serum total cholesterol significantly increased in

comparison to anestrus control. Adamski et al. (2011) indicated that there are no significant differences in levels of serum triglycerides in Simmental cows treated with 300 mL PG from 7 days before birth until 21 days after birth in comparison to control group.

On the other hand, Soni et al. (2018) reported that the levels of cholesterol did not differ significantly between anestrus Frieswal cross-bred heifers treated with GnRH analogue followed by PGF_{2α} on 8th day and control groups. Concerning the effect of PG treatment, Adamski et al. (2011) indicated that no significant differences in levels of serum total cholesterol in Simmental cows treated with 300 mL PG from 7 days before birth until 21 days after birth in comparison to control group. Recently, Abdul-Rahaman et al. (2020) showed that when Awassi ewes injected with 7.5 mg of PGF_{2α} after parturition the plasma concentrations of cholesterol and triglycerides significantly ($p < 0.05$) decreased as compared with Awassi ewes in control group. Nassef et al. (2019) reported that supplementation of 300 g PG to Holstein cows caused a significant increase in the levels of triglycerides in comparison to control animals.

Concerning the present results of activity of ALT, they are in accordance with those of Hussein et al. (2015) who found that serum enzyme activity of aspartate aminotransferase significantly ($p < 0.05$) decreased in buffalos administered 500 mL of PG before and after parturition in comparison to control buffalo group. Borş et al. (2014) showed that drenching of 600 mL of PG once daily for one week after delivery to Holstein Friesian cows significantly reduced activity of AST on day 15 postpartum when compared with the control group. Adamski et al. (2011) reported that when Simmental cows supplemented with 300 mL PG from 7 days before birth until 21 days after birth serum ALT activity showed no significant difference in cows supplemented with PG in postpartum when compared with prepartum.

On the other hand, Sahoo et al. (2017) showed that when crossbred cattle supplemented with different protocols of hormonal treatment (Doublesynch and Estradoublesynch synchronization) the activities of AST and ALT enzymes did not show any significant effect as compared with the control group. Virmani et al. (2011) found that treatment of anestrus Sahiwal cows with OvSynch protocol (PMSG-GnRH-PGF_{2α}-GnRH) caused a non-significant change in the level of serum AST as compared to the level

before treatment. Gabr et al. (2017) showed that when primiparous Egyptian buffalo cows supplemented with PG peripartum did not show any significant distinctions in plasma AST and ALT as compared to control group. Nassef et al. (2019) stated that supplementation of PG for 3 weeks before delivery and 8 weeks after delivery to Holstein cows had no significant differences in the activity of ALT enzyme as compared with control cows.

Furthermore, Abdul Ghaffar et al. (2018) reported that when Nili-Ravi buffalo heifers supplemented with 150 g or 300 g PG per animal per day for 30 days mixed in routine ration the level of serum ALT concentration was increased in comparison with non-treated buffalo group. Adamski et al. (2011) showed that when Simmental cows supplemented with 300 mL PG from 7 days before birth until 21 days after birth serum AST activity showed an increase in cows supplemented with PG in postpartum when compared with pre-partum.

The present data of creatinine levels in cows blood plasma were in good agreement with Abdelhamid et al. (2017) found that when Egyptian water buffalo heifers treated orally with PG biweekly for 8 weeks before delivery, they showed a non-significant decrease in blood plasma creatinine concentration when compared with control group. Ayoub et al. (2015) stated that the concentrations of serum creatinine decreased in dairy cows supplemented with 200 mL liquid dose of PG per day per cow, but this decreased was non-significant when compared with non-treated cows.

From another side, Singh et al. (2019) showed that treatment of buffalos with oral PG 250 mL once a day for 5 days caused a non-significant effect in plasma creatinine concentration as compared with its concentration pre-treatment. Abdul-Rahaman et al. (2020) showed that when Awassi ewes injected with 7.5 mg of PGF_{2α} after parturition, they did not show any significant differences in the plasma concentration of creatinine. Moreover, El-Malky et al. (2010) found that treatment of buffalos retained placenta with 10 ml GnRH at the 7th day postpartum significantly ($p < 0.05$) increased plasma creatinine level in comparison to buffalos retained placenta non-treated group.

CONCLUSION

The reproductive performance could be improved with direct treatment with PGF_{2α} (2.5 cm/head) and GnRH (2.5 cm/head) or PG (300 ml/head) or PGF_{2α} + GnRH + PG combination at the parturition. Finally, we can recommend the use of propylene glycol to improve reproductive performance in the Egyptian buffalo cows.

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Table 1. Mean \pm SEM for the effect of some hormones and propylene glycol, or their combination on some reproductive traits in Egyptian buffalo cows.

Items	DFM (h)	UI (d)	UHS (d)	CC (d)
Control group (G1)	7.88 \pm 0.44 ^a	29.00 \pm 2.06 ^a	37.25 \pm 1.10 ^a	36.88 \pm 0.99 ^a
PGF _{2α} + GnRH (G2)	4.63 \pm 0.38 ^b	20.63 \pm 0.46 ^b	22.38 \pm 0.75 ^{bc}	27.13 \pm 1.27 ^b
Propylene glycol (G3)	2.88 \pm 0.30 ^c	18.00 \pm 0.82 ^{bc}	23.75 \pm 0.70 ^b	29.25 \pm 1.39 ^b
PGF _{2α} + GnRH + Propylene glycol (G4)	2.63 \pm 0.26 ^c	16.13 \pm 0.88 ^c	20.25 \pm 0.68 ^c	22.25 \pm 0.45 ^c
<i>p</i> -value	<0.001	<0.001	<0.001	<0.001

Means with the same superscript letter within each column are not significantly different; drop of fetal membranes: DFM, uterine involution: UI, uterine horns symmetry: UHS, cervical closer: CC.

Table 2. Mean \pm SEM for the effect of some hormones and propylene glycol, or their combination on some reproductive indicators in Egyptian buffalo cows.

Items	PPFE (d)	DO (d)	N/C (s)
Control group (G1)	113.75 \pm 13.49 ^a	159.00 \pm 15.58 ^a	1.88 \pm 0.30
PGF _{2α} + GnRH (G2)	63.63 \pm 4.46 ^b	84.25 \pm 11.10 ^{bc}	1.38 \pm 0.18
Propylene glycol (G3)	74.00 \pm 5.14 ^b	102.63 \pm 10.41 ^b	1.50 \pm 0.19
PGF _{2α} + GnRH + Propylene glycol (G4)	33.38 \pm 4.76 ^c	48.25 \pm 13.50 ^c	1.25 \pm 0.16
<i>p</i> -value	<0.001	<0.001	0.21

Means with the same superscript letter within each column are not significantly different; postpartum first estrus: PPFE, days open: DO, number of services per conception: N/C.

Table 3. Mean \pm SEM for the effect of some hormones and propylene glycol, or their combination on plasma biochemical and enzyme activity in Egyptian buffalo cows.

Items	Control (G1)	PGF _{2α} + GnRH (G2)	propylene glycol (G3)	PGF _{2α} + GnRH + propylene glycol (G4)	<i>p</i> -value
Total protein (g/dL)	7.71 \pm 0.05 ^c	8.25 \pm 0.04 ^b	8.10 \pm 0.04 ^b	8.84 \pm 0.08 ^a	<0.001
Albumin (g/dL)	4.42 \pm 0.05 ^c	4.68 \pm 0.04 ^b	4.62 \pm 0.04 ^b	4.99 \pm 0.07 ^a	<0.001
Globulin (g/dL)	3.29 \pm 0.03 ^d	3.57 \pm 0.04 ^b	3.48 \pm 0.04 ^c	3.85 \pm 0.02 ^a	<0.001
Total lipid (g/dL)	565.33 \pm 22.87 ^c	672.80 \pm 29.10 ^b	667.80 \pm 29.10 ^b	808.67 \pm 17.57 ^a	<0.001
cholesterol (mg/dL)	171.10 \pm 6.38 ^c	217.25 \pm 14.83 ^{ab}	207.25 \pm 14.83 ^b	247.58 \pm 9.94 ^a	0.001
Triglyceride (mg/dl)	60.94 \pm 2.15	68.43 \pm 5.24	66.93 \pm 5.24	74.93 \pm 4.31	0.179
AST (U/L)	38.80 \pm 2.41 ^a	24.60 \pm 2.06 ^b	26.60 \pm 2.06 ^b	18.33 \pm 1.62 ^c	<0.001
ALT (U/L)	12.33 \pm 0.61 ^a	10.93 \pm 0.30 ^b	11.43 \pm 0.24 ^{ab}	9.80 \pm 0.24 ^c	<0.001
Creatinine (mg/dL)	1.74 \pm 0.06 ^a	1.32 \pm 0.05 ^b	1.37 \pm 0.05 ^b	1.07 \pm 0.04 ^b	<0.001

Means with the same superscript letter within each row are not significantly different ($p > 0.05$).

الأداء التناسلي بعد الولادة وقياسات الدم في الجاموس المصري المعامل ببعض الهرمونات والبروبيلين جليكول أو مزيج منها

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الملخص العربي

أجريت هذه الدراسة بعد الولادة مباشرة بهدف تقييم فعالية إعطاء البروستاجلاندين ف2-ألفا (PGF_{2α}) والهرمون المنبه للغدد التناسلية (GnRH) و/أو البروبيلين جليكول (PG) للجاموس المصري بعد الولادة على الأداء التناسلي وبعض قياسات الدم. وهذه التجربة أجريت بمحطة بحوث الجميزة بمحافظة الغربية التابعة لمعهد بحوث الإنتاج الحيواني-مركز البحوث الزراعية-وزارة الزراعة وذلك بالتعاون مع قسم الإنتاج الحيواني-كلية الزراعة بالقاهرة-جامعة الأزهر خلال الفترة من شهر ديسمبر 2017 إلى شهر أغسطس 2018. واستخدم في هذه الدراسة 32 حيواناً في فترة بعد الولادة بأعمار تتراوح من 4-6 أعوام وفي مواسم حليب تتراوح من 2-4 وكانت أوزان الحيوانات 50±600 كجم. وقسمت الحيوانات عشوائياً إلى أربع مجاميع متساوية على النحو التالي: - (1) مجموعة المقارنة (2). حقنت الحيوانات بـ 2.5 سم من الـ PGF_{2α} يوم الولادة ثم حقنت بـ 2.5 سم من الـ GnRH بعد 15 يوم من الولادة (3). تم تجريب الحيوانات بـ 300 مل من الـ PG المذاب في 3 لتر محلول ملحي/جاموسة في يوم الولادة واليوم الثالث والسادس والتاسع والثاني عشر والخامس عشر من الولادة (4). عوملت الحيوانات بنفس معالمتي المجموعة الثانية والثالثة. وأوضحت النتائج أن معاملة الجاموس المصري بعد الولادة مباشرة بالـ PGF_{2α}+GnRH أو بالـ PG أو بالـ PGF_{2α}+GnRH+PG أدت إلى تحسين معنوي في الأداء التناسلي (نزول الأغشية الجنينية-وقت عودة الرحم لوضعه الطبيعي-وقت تماثل قرني الرحم-وقت غلق عنق الرحم-الشياع الأول بعد الولادة-الأيام المفتوحة) مقارنةً بمجموعة المقارنة كما أظهرت النتائج أن تركيزات بلازما الدم من البروتين الكلي والألبومين والجلوبيولين والدهون الكلية والكوليسترول والجلسريدات الثلاثية قد زادت معنوياً بينما تركيز الكرياتينين ونشاط إنزيمي الـ AST والـ ALT قد انخفضوا مقارنةً بمجموعة المقارنة. نستخلص من هذه النتائج أن معاملة الجاموس المصري بعد الولادة مباشرة ببعض الهرمونات والبروبيلين جليكول أو مزيج منها لها تأثيرات مفيدة على الأداء التناسلي وقياسات الدم ولكن المعاملة بالمزيج من الهرمونات والبروبيلين جليكول قد أظهرت أفضل النتائج.

الكلمات الاسترشادية: البروستاجلاندين ف2-ألفا والهرمون المنبه للغدد التناسلية والبروبيلين جليكول والأداء التناسلي والجاموس المصري.