

PSEUDOPREGNANCY IN BITCH – A SILENT REPRODUCTIVE SHOCK: A CASE STUDY



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**A clinical report is submitted as per approved
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CONTENTS

Contents	Page No.
List of tables	ii
List of figures	ii
Abstract	iii
Chapter I: Introduction	1-2
Chapter II: Review of literature	3-4
Chapter III: Materials and methods	
3.1 Case presentation	5
3.2 Clinical examination	5-8
3.2.1 Physical examination	5-6
3.2.2 Ultrasonography (USG) findings	6
3.2.3 Radiography findings	6
3.2.4 Vaginal cytology	7
3.2.5 Blood chemistry	7-8
3.2.6 Treatment and follow up response	8-9
Chapter IV: Discussion	10-11
Chapter V: Conclusions	12
Chapter VI: Recommendation	13
References	14-16
Acknowledgements	17
Biography	18

List of Tables

Table No.	Titles	Page No.
Table 1	Serum biochemical parameters of studied pseudo-pregnant bitch	8

List of Figures

Figure No.	Title	Page No.
Figure 1	Enlarged mammary glands of the bitch	6
Figure 2	Secretion of milk from the teat when pressed	6
Figure 3	Performing ultrasonography of the bitch	6
Figure 4	No fetuses found at ultrasonography	6
Figure 5	Performing X-ray of the bitch	6
Figure 6	Left lateral view on X-ray with no fetuses	6
Figure 7	Profound intermediate cells (A) with few amount of para-basal cells (B)in vaginal cytology in Diff-quick stain.	7
Figure 8	Recovered bitch after 10 days of treatment	8
Figure 9	X-ray findings of recovered bitch	8
Figure 10	Ultrasonography findings of recovered bitch	9
Figure 11	Recovered bitch after 10 days of treatment	9

ABSTRACT

This case study presents a case of pseudo-pregnancy in a bitch. Pseudo-pregnancy is a common physiological phenomenon in bitch. A crossbred bitch was brought to the Shahedul Alam Quadary Teaching Veterinary Hospital (SAQTVH), Chattogram Veterinary and Animal Sciences University (CVASU), Khulshi, Chattogram, with symptoms of licking of the mammary glands, nesting behavior, loss of appetite, and restlessness. On clinical examination it was observed that enlargement of the mammary glands, as well as the secretion of clear milk from the teat when pressed. The diagnosis was made based on the history, clinical symptoms, ultrasonography, X-ray, blood chemistry, and vaginal cytology. A non-gravid uterus was found with thickened endometrial wall on ultrasonography and X-ray. The laboratory result showed that serum biochemical parameters were normal when compared with normal physiological values. In vaginal cytology, there were profound intermediate cells with a small amount of parabasal cells. It was determined that this was a case of pseudo-pregnancy. The bitch was given cabergoline (Tab. Cabargol[®] 0.5mg) and other supportive medications. After 10 days of treatment, reformed ultrasonography and X-ray findings revealed the normal appearance of uterus. All symptoms subsided gradually, and the bitch recovered completely during a follow up visit.

Keywords: Cabergoline, ultrasonography, vaginal cytology, bitch

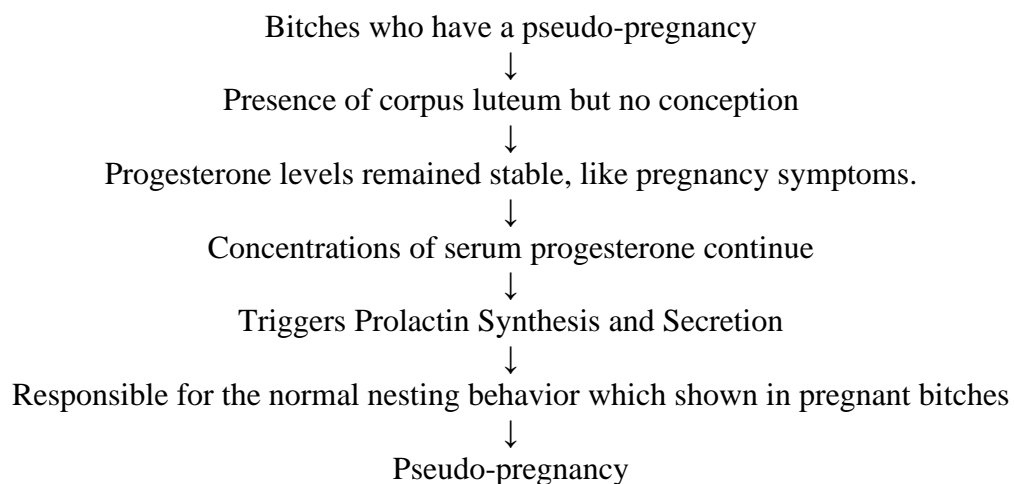
CHAPTER I

INTRODUCTION

Pseudo-pregnancy is one of the most common clinical features seen in non-pregnant domestic bitches. Ancel and Bouin (1911) coined the term "pseudo-pregnancy" to describe an unusually long luteal phase of the estrual cycle observed in dog (Singh et al., 2018). Pseudo-pregnancy is a clinical phenomenon in which a female who is not pregnant displays maternal behavior and physical symptoms of pregnancy at the end of diestrus (luteal phase). Pseudocyesis, pseudogenetra, false pregnancy, and phantom pregnancy are some of its synonyms. The exact cause is unknown, but it is commonly assumed that certain hormonal changes play a significant role in the emergence and maintenance of pseudo-pregnancy (Grunau et al.,1996).

Pseudo-pregnancy in dogs is considered as pathological by some researchers (Roberts 1971), while others it is considered as a physiological condition associated with the dog's sexual cycle (Arbeiter et al. 1988; Feldman and Nelson 1987). Serum progesterone concentrations in pregnant and pseudo-pregnant dogs exhibit the identical pattern, despite the hormonal mechanism of pseudo-pregnancy being clinically unexplained (Arbeiter et al. 1988; Braakman et al., 1993). Prolactin becomes a major luteotrophic agent in both situations between the 35th and 40th day of the oestral cycle (Dumon et al., 1993; Onclin et al.,1995). Prolactin is responsible for the morphological development of mammary glands, lactopoiesis, and galactopoiesis (Arbeiter et al. 1988).

The physiology of pseudo-pregnancy is represented as a flowchart diagram below:



(Concannon et al., 1989; Graf et al., 1977; Smith et al., 1974; Tsutsui et al., 2007)

A variety of physical and behavioral changes, including restlessness, anorexia, decreased activity, aggression, licking of the abdomen (Feldman and Nelson, 2004; Root et al., 2018), nesting, mothering inanimate objects, adopting other bitches' puppies (Romagnol et al., 2009; Gobello et al., 2011), weight gain, enlargement of the mammary glands, milk secretion, and occasionally abdominal contractions (Singh et al., 2018), have been documented in studies on pseudo-pregnant bitches.

The estimated incidence rate of pseudo-pregnancy in most dog breeds may range from 50 to 75% (Singh et al., 2018), although only a few cases have been recorded due to the lack of diagnostic facilities available in field conditions. Pseudo-pregnancy is a common occurrence, and it has been linked to financial losses for dog breeders and owners worldwide (Root et al., 2018; Ndumari et al., 2019).

This case report presents a case of pseudo-pregnancy in a bitch brought to the Shahedul Alam Quadary Teaching Veterinary Hospital (SAQTVH), Chattogram Veterinary and Animal Sciences University, Chattogram, Bangladesh. The owner believed that the bitch was actually pregnant in case of pseudo-pregnancy, and he has to take extra care of that bitch, which is so laborious. As a consequence, it has been linked to economic losses for dog owners. There is a lack of research on bitch pseudo-pregnancy in Bangladesh. The aim of this study was to diagnose and management of pseudo-pregnant bitch properly. Thus, this study may assist field veterinarians in managing these kinds of cases.

CHAPTER II

REVIEW OF LITERATURE

In dogs, pseudo-pregnancy develops 1-3 months after oestrus and it is a physiological and psychological condition. Researchers claim that the symptoms of canine pseudo-pregnancy are caused by the prolactin hormone (Feldman and Nelson, 1987; Jochle et al., 1989). Lactation must be suppressed in dogs who have pseudo-pregnancy, lose their puppies postnatally, are unable to nurse, or have eclampsia (Arbeiter et al., 1988; Dumon et al., 1993). Additionally, they note that dogs become agitated as a result of these symptoms, and that the danger of mastitis increases as the milk secretion builds up in the mammary glands.

Progesterone, oestrogen, androgen, mibolerone, bromocriptin, and cabergoline can all be used to suppress and control canine lactation and pseudo-pregnancy (Bowen et al. 1985; Onclin et al. 1995). High doses of oestrogen, progesterone, and other steroid hormones were utilized for this purpose in the 1970s due to the stimulating impact of prolactin secretion generated by modest levels of steroids (Brown 1984; Feldman and Nelson 1987). When steroids are administered in high doses, it can cause masculinization, ovarian and uterine tumors, recurrent pseudopregnancies, and a delayed response to treatment (Bastan et al., 1998).

Progesterone application in dogs is not advised because it will lead to further enlargement of the mammary glands and hypertrophia and hyperplasia in the endometrium, additionally, it creates a predisposition for pyometra (Arbeiter, 1993; Feldman and Nelson, 1987).

Cabergoline, an ergoline derivative that lowers prolactin, was recommended by Post et al. (1988) as an alternative to the medications that had been discovered to have negative effects.

According to numerous studies, bromocriptin and cabergoline (ergot alkaloids) prevent prolactin secretion from the anterior pituitary and bromocriptin applied daily at 0.1 mg/kg dosage may inhibit lactation but has the unfavorable side effect of vomiting (Arbeiter, 1993; Jochle et al., 1989; Onclin et al., 1995).

According to Arbeiter et al. (1988), in their studies aimed at suppressing lactation in dogs with pseudo-pregnancy, those whose young died postnatally, and those with eclampsia, the use of cabergoline, at daily oral doses or subcutaneously, caused clinical symptoms to reduce at a rate of 80% in 2-3 days and to disappear completely in 7 days. They also stated that the treatment was 95% effective and that cabergoline only caused vomiting when given as an injection, while similar effects were not seen when given orally. Furthermore, the efficacy of cabergoline for lactation suppression was proven in field trials.

Dumon et al. (1993), used cabergoline at a dose of 5 µg/kg per day for 5 days to suppress lactation in 63 bitches of various breeds, and reported that milk secretion stopped in less than 5 days and that vomiting was seen only once with four bitches, while it was seen several days consecutively in one bitch.

According to Jochle et al. (1987), study on Beagle dogs intended to suppress lactation, lactation was inhibited when cabergoline was administered at a dosage of 5 µg/kg over 3 days. No adverse effects were noted, and the dogs went on to show oestrus. After insemination during these oestrus, no fertility issues were noted.

According to Post et al. (1988) progesterone concentrations decreased 3 to 5 days after cabergoline treatment began. The results of various studies have been validated within three to four days of treatment by observations of softening in mammary glands, cessation of milk secretion, and the dogs starting to show interest in their owners and their surroundings. (Arbeiter, 1993; Dumon et al., 1993; Jochle et al., 1989;).

Thus, these above studies have proven that cabergoline administration is a safe and useful technique for treating pseudo-pregnancy and ending unexpected lactation.

CHAPTER III

MATERIALS AND METHODS

3.1 Case presentation

An approximately 11 years old bitch weighing 12 kg was brought to the Shahedul Alam Quadary Teaching Veterinary Hospital (SAQTVH), Chattogram Veterinary and Animal Sciences University (CVASU), Khulshi, Chattogram with symptoms of enlargement of the mammary glands, as well as the secretion of clear milk from the teat when pressed, licking of the mammary glands, loss of appetite, and restlessness. The bitch's owner claimed that the bitch carried clothing and other inanimate objects to the corner of the house where they formed a nest. It was also reported that no mating occurred with male dog. Since the bitch was kept in the owner's home under close confinement, there was no chance of an unintentional mating.

3.2 Clinical Examination

3.2.1 Physical examination

Physical manifestations were as follows

- Rectal Temperature 101.1°F
- Heart Rates 170 bpm (beats per minute)
- Respiration Rates 28 breaths/minute
- Mucous membrane: pink, moist
- Weight gain
- Mammary glands enlargement (Figure 1)
- The secretion of clear milk from the teat when pressed (Figure 2)
- There was no foetal feeling on palpation of the distended abdomen.
- Maternal behavioral changes: Nesting, mothering inanimate objects, adopting other bitches puppies
- Alopecia



Figure 1: Enlarged mammary glands of the bitch



Figure 2: Secretion of milk from the teat when pressed

3.2.2 Ultrasonography (USG) findings

Ultrasound is a common veterinary tool for determining pregnancy in both domestic and zoo animals. In this study, Ultrasonography (ExaGo, IMV Technology, USA) revealed that thickened endometrial wall and hypoechoic elongated uterus with no fetuses (Figure 3 and 4).



Figure 3: Performing Ultrasonography of the bitch

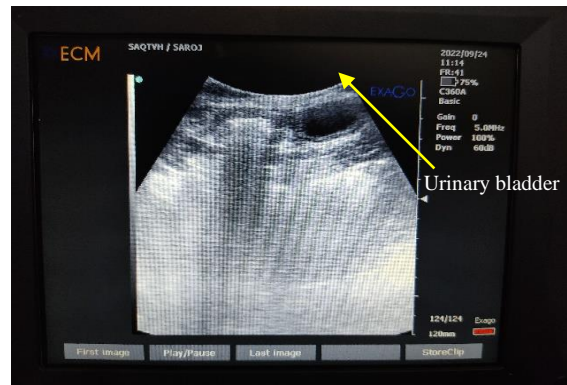


Figure 4: No fetuses found at Ultrasonography

3.2.3 Radiographic findings

In this study, Radiography (DR X-ray Machine) revealed that absence of radiolucent structure as well as fetus (Figure 5 and 6)



Figure 5: Performing X-ray of the bitch



Figure 6: Left lateral view on X-ray with no fetuses

3.2.4 Vaginal Cytology

Vaginal cytology also revealed that the animal had entered the late diestrus phase of the estrous cycle, as evidenced by the presence of profound intermediate cells and para-basal cells in the vaginal epithelium (Figure 7). Diff-Quik stain was used for cytology. For cytology, the last stage of the estrous cycle, known as diestrus, is mostly connected to squamous epithelial cells like intermediate or parabasal cells.

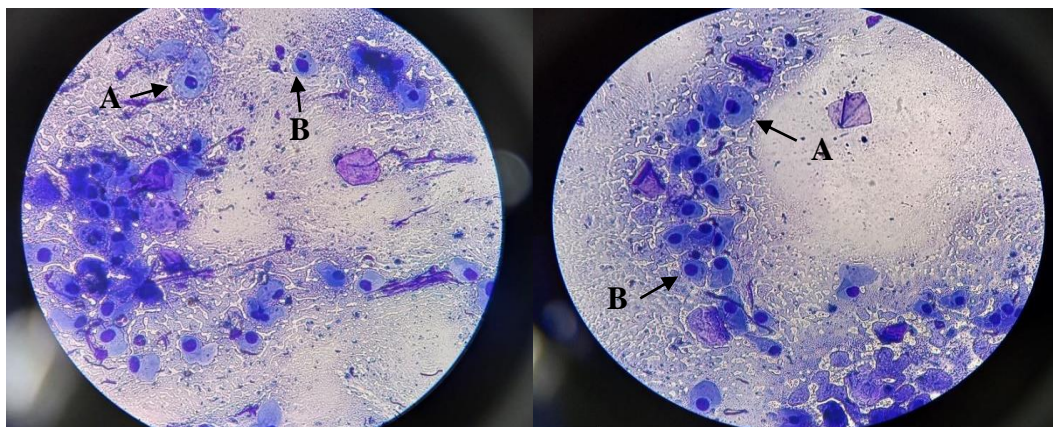


Figure 7: Profound intermediate cells (A) with few amount of para-basal cells (B)

3.2.5 Blood Chemistry

With the help of a sterile hypodermic syringe and a 21-gauge needle, 3 ml of blood were drawn from the bitch through the cephalic vein. For the purpose of evaluating the serum's biochemical composition, the blood was drawn into a vacutainer devoid of ethylene diamine tetraacetic acid; cold-packed and transported right away to a lab at CVASU. Within one hour of the blood sample being collected, the serum sample was extracted using the centrifugation procedure at 3,000 rpm for 10 minutes. The following serum biochemical parameters were assessed using an automated analyzer:

Table 1: Serum biochemical parameters of studied pseudo-pregnant bitch

Parameters	Observed value	Normal range*
Total protein (g/l)	70.4	62.0 to 80.0
Albumin (g/l)	32.3	30.1 to 42.2
Creatinine (mg/dl)	5.3	5.2 to 5.8
Glucose (mg/dl)	88.7	86.1 to 104.6
Calcium (mg/dl)	9.7	10.6 to 11.6
Phosphorus (mg/dl)	5.8	4.6 to 5.50
Magnesium (mg/dl)	2.1	1.5 to 2.7

*(Ariyibi et al., 2002; Choi et al., 2011)

Table 1 shows the biochemistry of the studied pseudo-pregnant bitch, and all of the values are within the normal physiological range.

3.2.5 Treatment and Follow Up of Response

The bitch was treated with Cabergoline (Tab Cabargol[®]0.5mg) @ 7µg/kg body weight 1/3th tab per day for 10 days; Omega-3 Acid Ethyl Esters (Cap. OMG-3[®])1/2th per day for 10 days and Zinc Supplement (Syp. Xinc B[®]) 1 table spoon twice daily for 10 days.

After 10 days of treatment, bitch mammary glands returned to normal size with no milk secretion from teats and other symptoms (Nesting behaviour, mothering inanimate objects, adopting other bitches puppies) of pseudo-pregnancy disappeared (Figure 8). Abdominal ultrasonography and X-ray were reperformed, and revealed that normal appearance of uterus (Figure 9, 10).

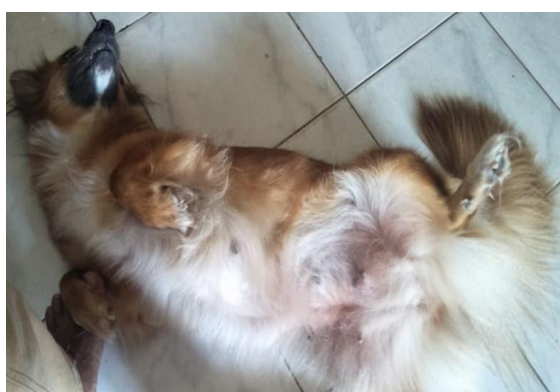


Figure 8: Mammary glands returned to normal size

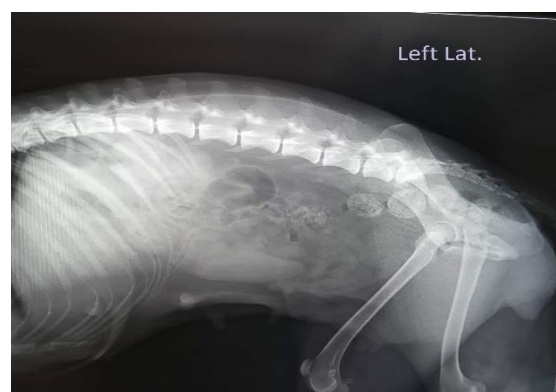


Figure 9: X-ray findings of recovered bitch



Figure 10: Ultrasonography findings of Recovered bitch



Figure 11: Recovered bitch after 10 days of treatment

CHAPTER IV

DISCUSSION

It is still unclear exactly what physiological processes lead to a pseudo-pregnancy (Garai et al., 2020). However, it is considered that as the metestrus, luteal, or proestrus phase of the cycle lasts for approximately the same duration as the pregnancy (8–9 weeks) in a bitch, the obvious indications of pregnancy are also visible during pseudo-pregnancy (Razzaque et al., 2008). After estrus has ended, the corpus luteum (CL) of non-pregnant bitches regresses in about 45–60 days (Garai et al., 2020). The loss of CL causes a progressive drop in progesterone levels, which triggers the release of prolactin, the primary hormone responsible for mammary gland hypertrophy and lactation (Concannon and Lein, 1989; Tsutsui et al., 2007; Yenilmez and Eren, 2019). In this study, ultrasonography revealed that thickened endometrial wall and hypoechoic elongated uterus with no fetuses. In some cases, the uterus may also contain fluid (Garai et al., 2020). Radiography also revealed that absence of radiolucent structure as well as fetus. The most common differential diagnosis is pregnancy, which can be ruled out with abdominal palpation, ultrasonography, or radiography late in diestrus when signs of pseudo-pregnancy appear (Feldman et al., 2004).

In current study vaginal cytology also revealed that the animal had entered the late diestrus phase of the estrous cycle, as evidenced by the presence of profound intermediate cells and para-basal cells in the vaginal epithelium. For cytology, the last stage of the estrous cycle, known as diestrus, is mostly connected to squamous epithelial cells like intermediate or parabasal cells (Ukwueze and Raheem, 2021).

The laboratory result showed that the phosphorus level was slightly high and other serum biochemical parameters were normal when compared with normal physiological values.

The dopamine-2 (D2) receptor agonist cabergoline, at a dose of 5 µg/kg body weight, was used to treat the animal (Sandhu, 2014). It is an ergot derivative. Pituitary gland activity is directly influenced by cabergoline (Arbeiter et al., 1988). Dopamine (or its agonist) inhibits the release of prolactin from lactotroph by binding to the D2 receptor and inhibiting adenylate cyclase (Yenilmez and Eren, 2019). There is no other endocrine impact of cabergoline (Dumon, 1993).

The bitch with pseudo-pregnancy symptoms was successfully treated with cabergoline and other supportive therapies. In this study, we used cabergoline, at a dose of 7µg/kg body weight for 10 days. The mammary gland lobes returned to normal on the fourth day in 95.5% and on the seventh day in 100%, in agreement with the results of Arbeiter et al. (1988). Omega-3 Acid Ethyl Esters was prescribed to treat changes of behavioural signs of the bitch. A combination of omega-3 fatty acids and zinc has been shown to improve some behavioral disorders in dogs with common behavioral disorders (Niyyat et al., 2018). The treatment was successful, with a success rate of 100% after 10 days, in terms of the emergence of the mammary gland lobes and the cessation of secretion.

When susceptible bitches are not intended for future breeding, the only permanent preventive measure is ovariectomy (Thangamani et al., 2018). Because pseudo-pregnancy can occur again, it should be done during the luteal phase, or the metestrus (diestrus) stage of the cycle (Allen,1986; Mialot et al., 1984). Pseudo-pregnancy occurs in all breeds of dogs and has significant socioeconomic consequences for dog breeders and owners (Raheem and Ukwueze, 2021).

CHAPTER V

CONCLUSIONS

It is concluded that the symptoms of pseudo-pregnancy are enlargement of the mammary glands, as well as the secretion of clear milk from the teat when pressed, licking of the mammary glands, loss of appetite, and restlessness. Ultrasound, x-ray, blood chemistry and vaginal cytology were used to confirm pseudo-pregnancy. The absence of fetuses detected by ultrasonography and x-ray, as well as the presence of scanty epithelial cells in vaginal cytology, confirmed and concluded that it was a case of pseudo-pregnancy. The bitch was treated with cabergoline and other supportive medications. All symptoms subsided gradually, and the bitch recovered completely during a follow up visit.

CHAPTER VI

RECOMMENDATION

As there is a lack of research on bitch pseudo-pregnancy in Bangladesh, further improved study and analysis can be done to better understand about the occurrences and treatment of pseudo-pregnancy in dogs. Thus, veterinarians can apply their best judgment to determine the best treatment strategy for each patient. Several authors reported that the effective method for prevention of pseudo-pregnancy is ovariohysterectomy i.e., removal of the uterus and ovary in case of non-breeding bitches. So, other than medicinal treatment, ovariohysterectomy can also be done for the correction of pseudo-pregnancy in dogs.

REFERENCES

- Allen, W. E. (1986). Pseudopregnancy in the bitch: the current view on aetiology and treatment. *Journal of Small Animal Practice*, 27(7), 419-424.
- Arbeiter, K. (1993). Anovulatory ovarian cycles in dogs. *Journal of Reproduction and fertility. Supplement*, 47, 453-456.
- Arbeiter, K., Brass, W., Ballabio, R., & Jöchle, W. (1988). Treatment of pseudopregnancy in the bitch with cabergoline, an ergoline derivative. *Journal of Small Animal Practice*, 29(12), 781-788.
- Ariyibi, A. A., Oyeyemi, M. O., & Ajadi, R. A. (2002). A comparative study of some hematology and biochemical parameters of clinically healthy Alsatian and local dogs. *African Journal of Biomedical Research*, 5(3).
- Bowen, R. A., Olson, P. N., Behrendt, M. D., Wheeler, S. L., Husted, P. W., & Nett, T. M. (1985). Efficacy and toxicity of estrogens commonly used to terminate canine pregnancy. *Journal of the American Veterinary Medical Association*, 186(8), 783-788.
- Choi, S. Y., Hwang, J. S., Kim, I. H., Hwang, D. Y., & Kang, H. G. (2011). Basic data on the hematology, serum biochemistry, urology, and organ weights of beagle dogs. *Laboratory animal research*, 27(4), 283-291.
- Concannon, P. W., Weinstein, P., Whaley, S., & Frank, D. (1987). Suppression of luteal function in dogs by luteinizing hormone antiserum and by bromocriptine. *Reproduction*, 81(1), 175-180.
- Concannon, P. W. (1989). Hormonal and clinical correlates of ovarian cycles, ovulation, pseudopregnancy and pregnancy in dogs. *Current Veterinary Therapy (Small Animal Practice)*, 10, 1269-1282.
- Dumon, C. (1993). Traitement de la lactation de pseudogestation chez la chienne par la cabergoline. *Pratique Medicale et Chirurgicale de l'Animal de Compagnie*, 28, 573-573.
- Feldman, E. C., & Nelson, R. W. (2004). Canine and Feline Endocrinology and Reproduction, 3rd Edt. *Saunders, St Louis*, 45-439.
- Garai, D., Mukherjee, I., Roy, I., & Mukhopadhyay, A. (2020). Pseudopregnancy in a bitch-a case report. *Indian J. Anim. Hlth*, 59(1), 103-104.

- Gobello, C., De La Sota, R. L., & Goya, R. G. (2001). A review of canine pseudocycosis. *Reproduction in domestic animals*, 36(6), 283-288.
- Gobello, C., Concannon, P. W., & Verstegen, J. (2001). Canine pseudopregnancy: a review. *Recent advances in Small animal reproduction*.
- Graf, K. J., Friedreich, E., Matthes, S., & Hasan, S. H. (1977). Homologous radioimmunoassay for canine prolactin and its application in various physiological states. *Journal of Endocrinology*, 75(1), 93-103.
- Grünau, B., Nolte, I., & Hoppen, H. O. (1996). The treatment of pseudopregnancy in the bitch with prolactin inhibitors metergoline and bromocriptine. *Tierärztliche Praxis*, 24(2), 149-155.
- Jöchle, W. (1987). The sexual cycle in the bitch: recent insights and impact on therapy and reproduction control. *Tierärztliche Praxis*, 15(3), 295-300.
- Ndumari, W., Se-embe, A. D., Oluwatosin, A., & Mhoh, I. H. (2019). Incidence of Clinical False Pregnancy among Breeds of Dogs at the Veterinary Teaching Hospital University of Agriculture Makurdi Benue State Nigeria. *Current trends in biomedical Engineering and Biosciences*, 18(2), 26-28.
- Niyyat, M. R., Azizzadeh, M., & Khoshnegah, J. (2018). Effect of supplementation with omega-3 fatty acids, magnesium, and zinc on canine behavioral disorders: Results of a pilot study. *Topics in companion animal medicine*, 33(4), 150-155.
- Okkens, A. C., Dieleman, S. J., Bevers, M. M., & Willemsse, A. H. (1985). Evidence for the non-involvement of the uterus in the lifespan of the corpus luteum in the cyclic dog. *Veterinary Quarterly*, 7(3), 169-173.
- Onclin, K., Silva, L. D. M., & Verstegen, J. P. (1995). Termination of unwanted pregnancy in dogs with the dopamine agonist, cabergoline, in combination with a synthetic analog of PGF₂alpha, either cloprostenol or alphaprostol. *Theriogenology*, 43(4), 813-822.
- Post, K., Evans, L. E., & Jöchle, W. (1988). Effects of prolactin suppression with cabergoline on the pregnancy of the bitch. *Theriogenology*, 29(6), 1233-1243.
- Raheem, K. A., & Ukwueze, C. S. (2021). A Case of Pseudopregnancy in a Bitch. *Journal of Advances in Medical and Pharmaceutical Sciences*, 1-5.
- Razzaque, W. A. A., Husain, K., Agarwal, S., & Kumar, S. (2008). False pregnancy in bitch. *Veterinary World*, 1(3), 92-95.

- Root, A. L., Parkin, T. D., Hutchison, P., Warnes, C., & Yam, P. S. (2018). Canine pseudopregnancy: an evaluation of prevalence and current treatment protocols in the UK. *BMC veterinary research*, *14*(1), 1-12.
- Singh, L. K., Bhimte, A., Pipelu, W., Mishra, G. K., & Patra, M. K. (2018). Canine pseudopregnancy and its treatment strategies. *Journal of Entomology and Zoology Studies*, *6*(3), 1076-1078.
- Smith, M. S., & Mc Donald, L. E. (1974). Serum levels of luteinizing hormone and progesterone during the estrous cycle, pseudopregnancy and pregnancy in the dog. *Endocrinology*, *94*(2), 404-412.
- Tsutsui, T., Kiriwara, N., Hori, T., & Concannon, P. W. (2007). Plasma progesterone and prolactin concentrations in overtly pseudopregnant bitches: a clinical study. *Theriogenology*, *67*(5), 1032-1038.
- Ukwueze, C. S., & Raheem, K. A. (2021). A Case of Pseudopregnancy in a Bitch. *Journal of Advances in Medical and Pharmaceutical Sciences*, *23*(10), 1-5.
- Yenilmez, K., & Eren, N. (2019). The utilization areas of cabergoline in veterinary gynecology. *Journal of Research in Veterinary Medicine*, *38*(1), 77-81.

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The Author

BIOGRAPHY



Bibi Amena, daughter of **Md. Anayet Ullah** and **Fatema Tuj Zohara**, was born on 28 March, 1998 at Chattogram district. She passed her Secondary School Certificate Examination from Sitakunda Girls' High School, Chattogram in 2014 (GPA 5.00). Then she passed her Higher Secondary School certificate examination from Sitakunda Govt. Mohila College, Chattogram in 2016 (GPA 5.00). Now she had completed her one-year long internship program for fulfilling the requirement of Doctor of Veterinary Medicine (DVM) degree in Chattogram Veterinary and Animal Sciences University, Chattogram, Bangladesh. During her internship period she received her clinical training on Veterinary Medicine from CVASU Lab Rotation, Shahedul Alam Quadery Teaching Veterinary Hospital (SAQTVH), PRTC, Teaching & Training Pet Hospital and Research Center (TTPHRC), UVH (Sitakunda), Central Veterinary Hospital, Central Disease Investigation Laboratory, Livestock Research Institute, Central Cattle Breeding and Dairy Farm, ACDI/VOCA, RV & F Depot, Chattogram Military Farm, Chattogram Zoo, Bangladesh National Zoo, managemental training from Research and Farm Based Campus (CVASU) and Privet Pet Clinic & Medicine Shop etc.

Her primary research interest is in pathology, zoonoses and poultry diseases. But she feels much interest to work on emerging infectious diseases of different animals.