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## Canine pseudopregnancy and its treatment strategies

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### Abstract

Pseudopregnancy is the most frequent finding syndrome of clinical signs observed in the nonpregnant domestic bitch. Pseudopregnant bitches show different clinical signs with those similar clinical signs shown by pregnant bitches. Decreased levels of progesterone concentration resulting in increased levels of prolactin predispose the bitches to pseudopregnancy. Pseudopregnancy is a normal phenomenon. Diagnosis is mainly carried out on the basis of the clinical signs revealed by the dog associated with the absence of fetuses by radiography and ultrasonographical examination. Several methods with varying results exist for the management of clinical forms of pseudopregnancy in the bitch. The only permanent solution for prevention of pseudopregnancy in the bitch is ovariectomy. The objective of this present review is to describe the relevant aspects of physiology, clinical signs, diagnosis and treatment strategies of pseudopregnancy in the domestic bitch.

**Keywords:** Canine, dog, domestic bitch, pseudopregnancy

### 1. Introduction

The female dog has several unique reproductive features in comparison to other domestic and laboratory species. Ancel and Bouin (1911) first used the term pseudopregnancy to describe an abnormally long luteal phase of the estrual cycle observed in the rabbit. Pseudopregnancy is a syndrome characterized by clinical signs similar to those seen in late pregnancy or the early post-partum period [1]. Its synonyms are false pregnancy, phantom pregnancy, pseudocyesis, pseudogenetra and nervous lactation. It is now a frequent finding noticed in female dogs. The incidence of pseudopregnancy in most breeds is unknown but it is estimated to be as high as 50-75% in certain breeds [2]. The exact cause is not completely understood although it is normally suggested that certain hormonal changes might play an essential role in the development and maintenance of pseudopregnancy [3]. Thus, the present review describes the relevant aspects of physiology, clinical signs, diagnosis and treatment strategies of pseudopregnancy in domestic bitch.

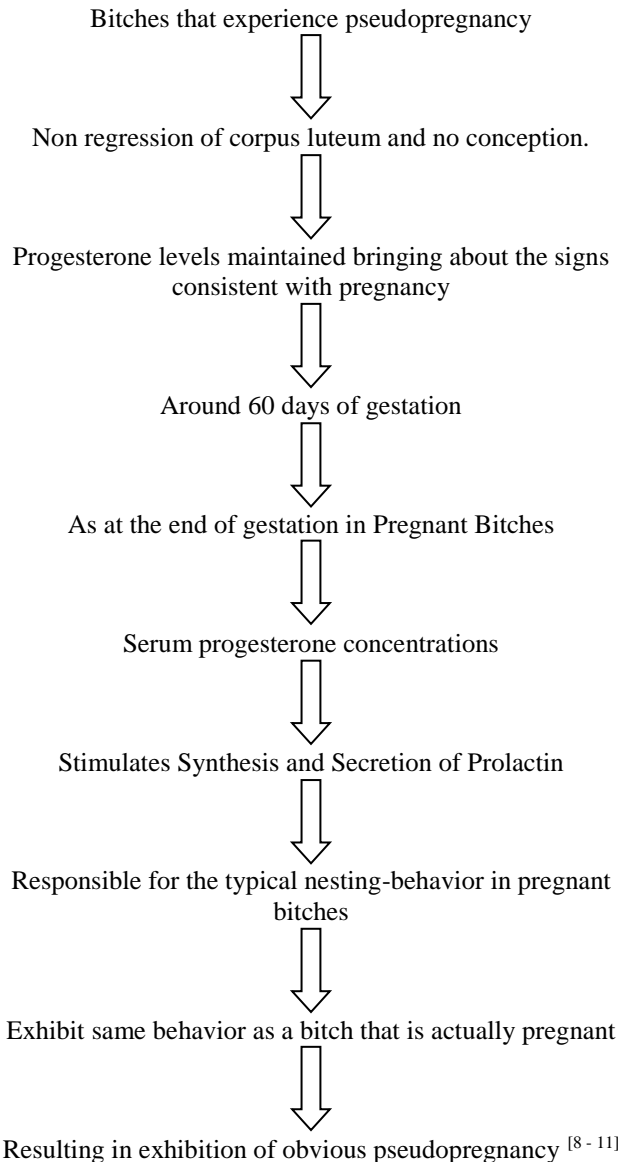
### 2. Types of pseudopregnancy

**Table 1**

Physiological or Covert	Clinical/Overt	References
<ul style="list-style-type: none"> <li>▪ The "physiological, pseudo pregnancy"</li> <li>▪ Every non-pregnant ovarian cycle in bitches</li> <li>▪ Considerable mammary development associated with the luteal phase of every ovarian cycle</li> </ul>	<ul style="list-style-type: none"> <li>▪ Changes similar to those seen in late pregnancy or the early post-partum period, the condition is: "clinical pseudo pregnancy"</li> <li>▪ Extreme behavior or atypical mammary activity</li> <li>▪ Extreme of the physiological changes that normally occur during diestrus</li> <li>▪ Lactation or Abdominal contractions</li> </ul>	[4-7]

### 3. Physiology

The physiology of pseudopregnancy is represented as a flowchart diagram below:



### 4. Clinical signs

Pseudopregnancy mimics signs of parturition and lactation in the pregnant bitch. Clinical signs usually begin 6 to 12 weeks after estrus [12]. Different clinical signs observed in pseudopregnant bitches has been reported by several workers (Table 2). Bitches undergone examination for delayed parturition, uterine inertia, or dystocia that has subsequently been demonstrated to be pseudopregnant. Susceptible bitches

have a high recurrence rate in successive oestrous cycles [1, 7].

**Table 2:** Reported clinical signs observed in bitches affected with pseudopregnancy

	Clinical signs	References
Psychological or behavioural changes	Restlessness, anorexia, decreased activity, aggression, licking of the abdomen	[13, 14]
Maternal behavioural changes	Nesting, mothering inanimate objects, adopting other bitches puppies	[14, 15]
Late gestational physical changes	Weight gain, mammary enlargement, milk secretion, and sometimes abdominal contractions	[1, 7, 12, 14, 16, 17]
Less common signs	Emesis, Diarrhea, Polyuria, Polydipsia and Polyphagia	[2, 13]

### 5. Diagnosis

The diagnosis is based on the presence of any above clinical signs exhibit by the dog. The major differential diagnosis is pregnancy, which can be generally ruled out by abdominal palpation, ultrasonography or radiography late in diestrus when signs of pseudopregnancy commence [1].

### 6. Treatment strategies

#### 6.1 No treatment

Other than discouraging maternal behaviour, no treatment needs to be recommended for pseudopregnancy as it is a normal phenomenon that resolves spontaneously and typically lasting 1-3 weeks.

#### 6.1.2 Conservative therapy

Placing of Elizabethan collars around the neck to prevent licking of the mammary glands is recommended. Licking, milking, or warm or cold packing the glands are strong stimuli for lactation and need to be avoided. Water removal for 5-7 nights forces fluid conservation and therefore, helps in termination of lactation [1, 17]. When behavioural signs are significant, light tranquilization with non-phenothiazine drugs can be useful. On the other hand, phenothiazines are not recommended as they stimulate prolactin secretion [18].

#### 6.1.3 Symptomatic therapy

If the conservative therapies are not responding and lactation is persistent, additional symptomatic therapy by medicinal drugs may be considered. Medicinal therapy with different sex steroids and dopamine agonist (prolactin inhibitors) has been used successfully for management of pseudopregnancy by several workers (Table. 3). Sex steroids are necessary for mammary development, high doses exert a negative effect thereby inhibiting pituitary release of prolactin [2, 4].

**Table 3:** Reported different medicinal drugs for treatment of pseudopregnant bitches

Medicinal drugs	Compositions	Dose rate	Effects	References
Sex Steroids	Estrogen: Diethylstilbesterol	1mg/day orally for 7 days	Signs of proestrus or estrus or uterine diseases, such as pyometra, and bone marrow hypoplasia	[1, 14]
	Progesterone derivatives: Megesterol acetate	2mg/kg/day orally for 8 days	Hypothyroidism, diabetes mellitus, cystic endometrial hyperplasia	[1, 14]
	Androgen derivatives: Mibolerone	36 µg/kg orally once for the first 5 days	Clitoral hypertrophy, other forms of virilization, and epiphora	[14, 19]
	Testosterone	1mg/kg IM once		
Prolactin inhibitors (Ergot derivatives)	Bromocriptine	10 - 100 µg/kg per day orally for 10-14 days	Vomiting(subsided by antiemetic drugs), anorexia, depression	[17, 19, 20]
	Cabergoline	5µg/kg per day orally for 5-10 days	Few side effects (more D2 dopamine receptor agonist)	
	Metergoline	0.2 mg/kg per day orally for 8-10 days	Anxiety, aggressiveness, hyper excitation and whining	

#### 6.1.4 Surgical therapy

Ovariohysterectomy is the only permanent preventive measured when predisposed bitches is not intended for future breeding<sup>[19]</sup>. It should be done during the luteal phase, i.e. in the metestrus (diestrus) stage of the cycle as pseudopregnancy may recur again indefinitely<sup>[4, 17]</sup>.

#### 7. Conclusion

It can be concluded that the veterinarian should made advice to the clients about the management of clinical forms of pseudopregnancy. Discouraging pseudopregnant bitches licking of the mammary gland as pseudopregnancy can be aggravated. Several authors reported different managemental practices of clinical forms of canine pseudopregnancy with varying results. However, the permanent solution for prevention of pseudopregnancy is ovariohysterectomy i.e. removal of the uterus and ovary in case of non-breeding bitches.

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