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Theriogenology 78 (2012) 817–822

Theriogenology

www.theriojournal.com

Ovarian activity reversibility after the use of deslorelin acetate as a short-term contraceptive in domestic queens

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Received 8 October 2011; received in revised form 20 March 2012; accepted 20 March 2012

Abstract

The objective was to evaluate ovarian activity reversibility in domestic queens after short-term contraceptive treatment with deslorelin acetate. Ten mature queens were used. In all queens, the estrous cycle was evaluated every 72 h by vaginal cytology (VC) and behavior assessments. When queens had VC characteristic of interestrus or diestrus, one deslorelin acetate implant (4.7 mg) was placed in the subcutaneous tissue of the interscapular region (day of insertion = Day 0). Thereafter, VC was performed every 48 h and on Day 90, implants were removed. At Day 100, estrus and ovulation were induced with 100 IU eCG (im), followed by 100 IU hCG (im), 84 h later (Day 103.5). Queens were ovariohysterectomized on Day 106. Corpora lutea (CL) were counted, oviducts were flushed, and oocytes were identified, isolated and stained to assess viability. In all queens, blood samples for plasma progesterone concentrations were collected once a week, from Days −21 to 106. After deslorelin acetate application, four queens had VC and behavior typical of estrus, and one ovulated. Furthermore, ovulation occurred in three queens that did not have VC or behavior consistent with estrus. After the initial ovarian stimulation, all females had anestrous VC during the deslorelin treatment period. Implants were readily removed. Following implant removal, all females responded to treatments to induce estrus and ovulation. There were (mean ± SEM) 13.1 ± 5.5 CL and 8.1 ± 5.5 oocytes per queen; the oocyte recovery rate was 56.8 ± 25.4% and all recovered oocytes were viable. We concluded that deslorelin acetate can be used as a reversible short-term contraceptive in domestic cats, because estrus and ovulation were successfully induced following implant removal.

Keywords: Deslorelin acetate; Contraception; Domestic cat; Oocyte recovery

1. Introduction

Gonadotrophin releasing hormone (GnRH) is a decapeptide that belongs to a group of neuropeptides of hypothalamic origin which control secretions of the anterior pituitary. It is well known that GnRH influences reproductive processes, mainly by regulating pituitary gonadotropin synthesis and release, which in turn modulate steroidogenesis and gametogenesis [1].

Continuous exposure to GnRH reduces its secretion by downregulating GnRH receptors; this has been used for reversible contraception [2]. In females, exogenous GnRH agonists initially causing a gonadotropin release, which enhances folliculogenesis and may cause ovulation, followed by downregulation and ovarian quies-

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http://dx.doi.org/10.1016/j.theriogenology.2012.03.030

cence [3]. Only three GnRH agonists have been reported as contraceptive in female felids: leuprolide [4,5], deslorelin acetate [3] and azagly-naferalin [6].

Munson, et al. [3] reported for the first time the use of deslorelin acetate (6 mg per animal) as contraceptive in domestic queens. In that study, treated females remained in anestrus for up to 14 mo. Although GnRH agonists have been described as a reversible contraceptive, few studies have specifically demonstrated reversibility. Returns to estrus following the use of deslorelin acetate have been considered asynchronous [3]. Ackermann, et al. [7] treated queens for 60 days with deslorelin acetate (4.7 mg) and reported that they return to normal cyclicity, on average, 42 days after implant removal.

In clouded leopard (*Neofelis nebulosa*) females, only one of seven animals ovulated and developed a normal luteal phase after two injections of leuprolide acetate (3.75 mg/animal) were given for contraception [5]. The authors considered this response inconsistent and attributed it to a severe ovarian alteration and desensitization to hormonal stimulation. This was not expected, because clouded leopards are known for their hypersensitivity to exogenous gonadotropins.

Inconsistent responses were not restricted to feline females [3,8]; similar results have already been described in other species, including dogs [9,10] and giraffes (*Giraffa camelopardalis*) [11]. When treated with GnRH agonists, common brushtail possum (*Trichosurus vulpecula*) had an estrous cycle and pregnancy, with variations among individual animals in the interval needed to restore cyclicity [12].

The first estrus and ovulation induction after 60 days of treatment with deslorelin acetate (4.7 mg/animal) in domestic cats was reported recently [7]. In that study, no ovarian desensitization to hormonal stimulation occurred, despite the efficacy of the contraceptive treatment. Thus, further studies assessing ovarian activity return and ovulation after deslorelin acetate contraceptive treatment should be conducted.

The aim of this study was to evaluate ovarian activity after short-term contraceptive treatment with deslorelin acetate in queens.

2. Materials and methods

2.1. Animals

Ten mature mixed-breed queens (2–3 yrs old) were kept in an experimental cattery at the Department of Veterinary Surgery and Anesthesiology, Faculty of Veterinary Medicine and Animal Science, FMVZ, Unesp, Botucatu, SP, Brazil. There was 12 h light/day, with at least 150-lux intensity. The animals were fed commercial cat food (Royal canine Queen 34 Royal canine, Descalvado, SP, Brazil) and water *ad libitum*. Before the study began, all cats were vaccinated against common feline viruses (feline herpesvirus, feline calicivirus, feline panleukopenia) and rabies. Ultrasonography was used for the general examination of reproductive tracts.

2.2. Estrus cycle monitoring

In all females, the estrous cycle was evaluated by vaginal cytology (VC) and behavior observations, conducted every 72 h by one trained observer, at 0900 to 1000. Estrous signs were detected by manual stimulation of the hindquarters for 5 to 10 min. For the procedure, each queen was individually placed on a table and hindquarters were stimulated manually. The signs observed were tail deflection, spinal flexion, rubbing or rolling, vaginal discharge, vocalization, treading of the hind legs, body or tail tremor and rigidity, and any striking out, clawing and scratching, or obvious discomfort on manipulation (grunting and escape attempt).

For VC, females were physically restrained and the vulva region was cleaned with dry gauze. Then, a gynecologic brush was introduced cranially in the vaginal canal and delicately rotated. The material collected was transferred to a glass slide, stained with rapid panotic (Panotico Rápido LB Laborclin Produtos Para Laboratórios, Ltda, Pinhais, PR, Brazil) and evaluated under light microscopy (200 or 400 x). One hundred cells were classified according to criteria proposed by Johnston, et al. [13].

2.3. Short-term contraceptive treatment

When queens had VC characteristic of interestrus or diestrus (Day 0) evidenced by $\leq$70% superficial epithelial cells, the queens were anesthetized with ketamine hydrochloride (15 mg/kg im; Dopalen, Vetbrands do Brasil, Paulínia, SP, Brazil) and xylazine hydrochloride (1 mg/kg im; Xilazin, Syntec do Brasil, Cotia, SP, Brazil). A deslorelin acetate implant (Suprelorin, Peptech Animal Health Pty, Limited, NSW, Australia; 4.7 mg/animal) was inserted in the subcutaneous tissue of the interscapular region (the area had been shaved and cleaned). After implant insertion, VC was performed every 48 h. On Day 90, the females were again anesthetized and the implants were removed through an incision on the interscapular region.