



Medical Termination of Pregnancy in Queen

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ABSTRACT

Cats routinely undergo medical termination of pregnancy (MTP) to control reproduction by terminating unwanted pregnancies. Post-coital contraception, also known as emergency contraception or pregnancy termination, are indeed common procedures in veterinary practices for companion animals like bitches and queens. Typically, a veterinarian guides these procedures, which may involve medications or surgical interventions based on the pregnancy stage and specific circumstances. Pet owners must discuss their options with a veterinarian to determine the best course of action for their animal's health and well-being, taking into account factors such as the dam's age, health issues, or low breeding value offspring. Medical termination of pregnancy has more demand in feline practice due to the higher incidence of unwanted pregnancy for their feral nature. In such cases, termination of pregnancy may be achieved by using only one medicament or a combination of two or more medicaments. A combination of either natural or synthetic analogues of prostaglandin F₂ and dopamine agonists or anti-progestins yielded good results in healthy bitches and queens with confirmed pregnancy. Regular sonographic examinations and vaginal discharge observation follow to confirm the loss of pregnancy. At certain times, blockage of two hormones, i.e., prolactin and progesterone, is used, which has high success rates for MTP in small animals. The benefits of combined administration include low doses with fewer side effects. Considering all such issues, this treatise deals with indications for MTP, symptoms to identify pregnancy, especially in feral cats, and the application of various protocols for successful results with uneventful outcomes.

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Introduction

Mismating or unplanned mating is a common clinical problem in sexually matured queen cats because of their free-roaming nature. Hence, medical termination of pregnancy becomes a frequent request from pet owners (Eilts, 2002). These procedures are often necessary for various reasons, including unwanted pregnancy in instances where pet owners may not intend to breed their animals but accidental mating happens. Moreover, unwanted pregnancy and queening during certain health issues can pose risks to the well-being of the queen, especially if she is very young or elderly or if she has pre-existing health conditions that could be exacerbated by pregnancy and birth. Very young or very old female animals may not be physically capable of safely carrying and delivering a litter. Additionally, in breeding programs where not all offspring meet the desired standards or possess the desired traits, small breeding values may necessitate terminating the pregnancy. In all such cases, you have the option to terminate the pregnancy immediately after mating or later on after confirming the pregnancy. Under such circumstances, it is necessary for the pet owners to clearly identify the stage of the pregnancy before proceeding for MTP under veterinary guidance only (Fig. 1). The date of mating and ultrasonography examination determines the stage of pregnancy in an animal.

For termination of pregnancy, different approaches are employed when the queen cat is in early pregnancy or in late pregnancy. In the early stages of pregnancy, the oestrogen hormone is used to stop the pregnancy. In the middle and late stages, drugs like prostaglandin F2 alpha (PGF2 α), anti-prolactin drugs, and anti-progesterone (Table-2) are used alone or together to end the pregnancy medically. Prostaglandins F2 α have a luteolytic effect on the corpus luteum, causing abortion, but most side effects have been observed. Cats undergo pregnancy or gestation for approximately 60–65 days. During pregnancy, progesterone is produced by the corpus lutea, which helps to maintain pregnancy

(Fig. 2). However, the placenta produces progesterone in queen cats after 40–50 days of gestation, independent of the corpus lutea, rendering the administration of F2 unnecessary. Recently, aglepristone (AGL), a progesterone receptor antagonist, has been recommended for medical termination of feline pregnancy. Dopamine-agonist drugs that inhibit prolactin secretion cause pregnancy termination.

What owner's can do after a mis-mating?

Successful mating leads to the establishment of a pregnancy. If an animal in estrus inadvertently mates with Tom, the likelihood of conception increases. This is because the queen is an induced ovulator, and mating triggers a peak LH surge, which in turn triggers ovulation and fertilization. If the owner has no interest in kittens, we recommend ovario-hysterectomy as a permanent solution for mismating. In cases of unintentional mating, the owner should confirm the estrus by observing signs like vulvar swelling, sero-sanguinous vulvar discharge, increased proximity toward the male, increased vocalisation, excessive grooming, rubbing of the head, and lordosis behaviour. If the queen cat is in estrus and mating happens, the chances of becoming pregnant would be high (Table 1). Examining the vaginal smear for the presence of spermatozoa or measuring the length of the oestrus cycle confirms successful mating. The presence of spermatozoa in the vaginal smear, along with a non-return estrus within 14–28 days, indicates that the female may be pregnant.

If the owner does not witness mating, they should confirm pregnancy based on signs such as increased appetite, abdominal enlargement, absence of the estrus sign, weight gain, morning sickness, mammary gland enlargement, and mating behaviour. Whether the owner has observed mating or not, ultrasonographic examination should confirm pregnancy in all such cases 25–30 days after the estrus (Fig. 1).

Table 1: Depicting the frequency of mating and conception rate on the day of the starting estrus period (Tsutsui et al., 2009)

Mating day of estrus	Frequency of mating/day	Ovulation %	Conception rate %
1st day of estrus	1	60%	33.3%
1st day of estrus	3	70%	85.7%
5th day of estrus	1	83.3%	40%
5th day of estrus	3	100%	100%

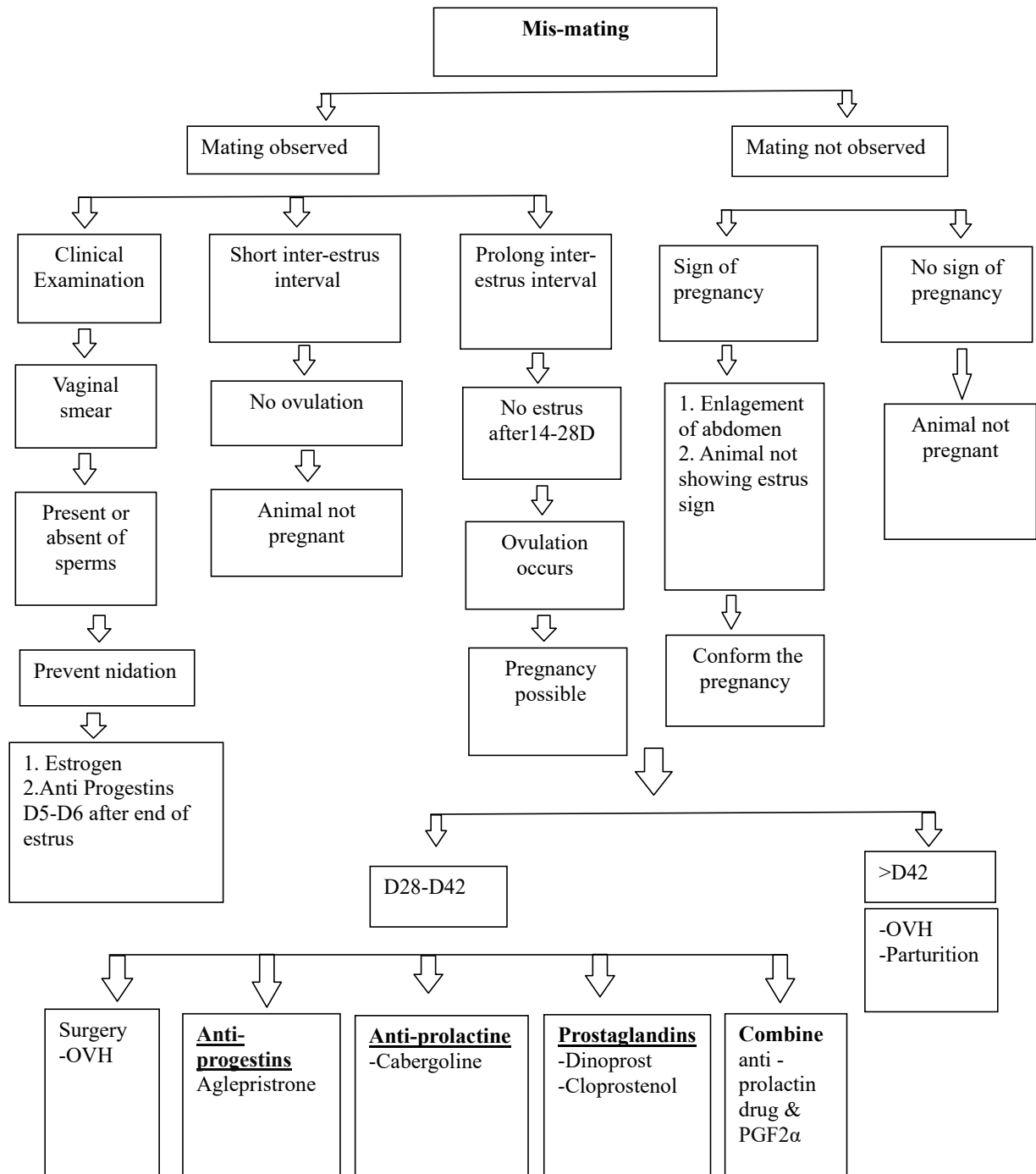


Fig. 1: The figure shows the basic steps for handling mismating and therapeutics in cats (Goericke-Pesch, 2022).

Table 2: Role of different hormones in termination of pregnancy

Estrogen	Retards transportation and degenerating of ova (Herron and Sis, 1974)
Dopamine agonist	Suppression of prolactin secretion by endogenous dopamine released from dopaminergic neurons in the hypothalamus
Prostaglandins	Causes regression of corpus lutea and suppresses the progesterone secretion
Anti-progestines	Antagonist of progesterone hormone receptor or prevent synthesis
Corticosteroids	Similar mechanism occurring during parturition

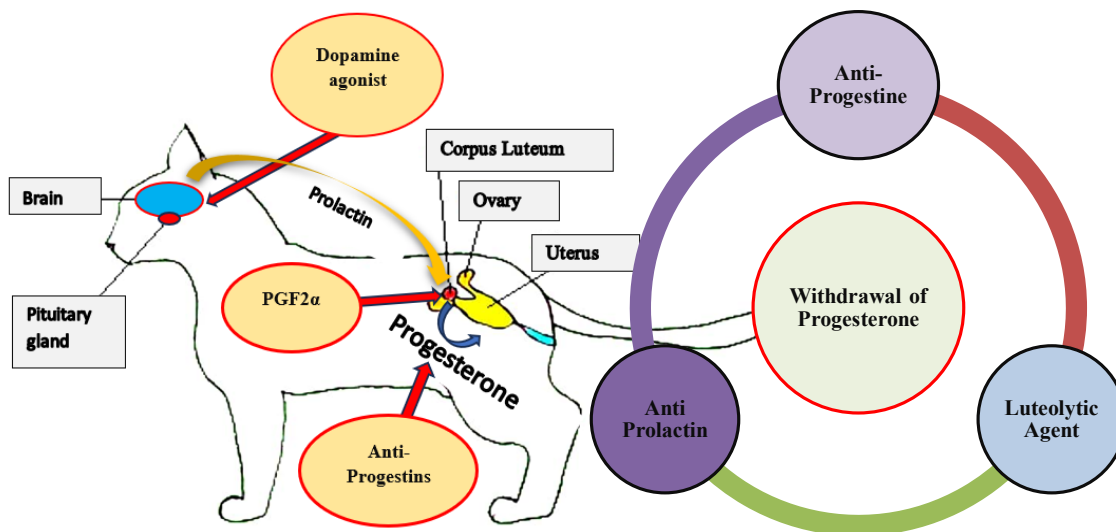


Fig. 2: Mechanism of action of various drugs on reproductive hormone production

Table 3: Drugs used to terminate an early pregnancy just after mating.

Drug	Dose	Side effect	Note	Reference
Estadiol cypionate Supress the movement of egg affect implantation Brand-Depo-Estradiol	0.125 to 0.25 mg/ kg, I/M 2-3 day after coitus one time	Bone marrow toxicity, Aplastic anaemia, Thrombocytopenia, Leukopenia, Pyometra	Behavioural estrus will be extended in duration	Goericke-Pesch et al., 2010; Kustritz, 2011
Aglepristone Brand -Alizin	10 mg/kg S/C on 5th-6th day of mating	No major side effect observed		Goericke-Pesch et al., 2010

The different types of hormones being used in termination of pregnancy (Table 2) and their mechanism illustrated in Fig. 2. However, the use of the therapeutics for medical termination of pregnancy in queen cats can be subdivided into 2 stages, namely, for use in MTP just after copulation (within a week) or for use 25–30 days after confirmed pregnancy.

Medical termination of pregnancy in queen cats just after copulation (within a week of mating)

Estrogenic agents: Ovum transport in a cat’s reproductive tract takes about 4 to 5 days after coitus to reach the isthmus. 40 hours after coitus, cats receive oestrogen, which slows down ovum transport and potentially leads to degenerative changes. This may be due to the fact that the oestrogen-treated glandular endometrium of cats histologically resembles the late proliferative phase rather than the secretory phase (Herron and Sis, 1974). Table 3 describes the various drugs used for early pregnancy termination.

Advice to the owners: Use of oestrogen hormone for treatment of early termination of pregnancy may cause

severe side effects like bone marrow suppression, aplastic anaemia, leukopenia, and estrus behaviour. Avoid using oestrogen blindly, as it may cause blindness in a queen cat, which veterinarians consider unethical.

Medical termination of pregnancy 25-30 days after confirmed pregnancy prostaglandins

All tissues naturally contain prostaglandins (PGs), which are prostanoids derived from arachidonic acid. They have multiple effects on the biochemical activity of vascular, gastrointestinal, respiratory, and reproductive tissues. Most mammals have found Prostaglandin-F2 alpha (PGF-2 alpha) to have luteolytic and uterotonic properties. Cats have used a highly potent synthetic analogue of prostaglandins like cloprostenol for pregnancy termination. We must use PGF2 alpha very cautiously due to its potential effects on other body systems, including hypersalivation, bradycardia, reflex defecation, urination, and emesis (Lein et al., 1989). Pre-medication given 15 min before prostaglandin analogue injection includes atropine sulphate, prifinium bromide, and metopimazine to reduce side effects.

Antiprolactin or dopamine agonist: The anterior pituitary glands lactotroph secretes the hormone prolactin. Various neurotransmitters and hormones influence its secretion. In queen cats, this hormone begins to rise on day 35 of gestation, reaches a plateau two weeks later, continues through parturition and the first four weeks of lactation, and reaches its lowest point shortly after weaning. In cats, prolactin hormone acts as a luteotropic; thus, administering the anti-prolactin drug reduces progesterone and causes fetal absorption or abortion (Johnson and Gay, 1981). Commonly used anti-prolactin agents for this purpose are dopamine agonists like bromocriptine and cabergoline. Cabergoline works better than bromocriptine as a dopamine agonist because it has a longer half-life, doesn't bind to D1 receptors as well, and stimulates 5HT2B receptors more strongly. Compared to bromocriptine, cabergoline has fewer side effects. This may be because it only binds to D2 receptors (Krysiak and Okopien, 2014).

Anti progestine: Progesterone, also known as the pregnancy hormone, aids in pregnancy maintenance by stimulating endometrial development and placental attachment, as well as uterine quiescence by reducing uterine muscle contractility. The corpus luteum primarily produces progesterone in queen cats during 40–45 days of gestation, while the placenta produces it during the last three weeks of gestation. Progesterone antagonists, which bind to the progesterone receptor and occupy it, prevent the initiation of normal activities in queen cats. Progesterone receptor

antagonists disrupt normal reproduction and terminate pregnancy in most species. Some recent reports suggest that aglepristone can prevent pregnancy in cats (Karakas et al., 2019).

Use of corticosteroid: Dexamethasone is a synthetic glucocortisone that has anti-inflammatory, immunosuppressive, and abortifacient effects. The use of Dexamethasone in bitch leads to the termination of mid-gestational pregnancy; similar mechanisms are involved in the normal physiology of parturition. Corticosteroid offers the advantage of oral administration and lower cost compared to other drugs. Dogs have shown it to be 100% effective (Wanke et al., 1997), but there is no such report for cats.

Combine use of prostaglandins and anti-prolactin or anti progestin: The goal is to achieve abortifacient efficacy with minimal side effects, without the need for daily injections or clinical visits. Studies have shown that combined use of the PGF analogue cloprostenol combination with the dopamine agonist cabergoline is effective in inducing abortion or complete fetal resorption (Kumar et al., 2022). The combination of gleprestone and cloprostenol increases the late-term pregnancy termination rate in queens (Karakas et al., 2019). The combined use of misoprostol and aglepristone in mid-term pregnancy in cats provides a more effective abortifacient than using either of them alone (Serhan et al., 2018), as shown in Table 4.

Table 4: Protocol reported for medical termination of pregnancy in queens using single or combined drugs after 25–30 days of pregnancy.

Drug	Dose	Side effect	Note	Reference
Dinoprost Brand-Lutalyse	0.5 to 1 mg/kg BID (S/C) after day of 40 Or 2mg OD (I/M) 5 Consequence day after 30D	Ptyalism, Vomiting, diarrhoea	Side effect include panting and mydriasis and occur within minute of drug administration and subsiding within 1h to 3h	Kustritz, 2011
Cloprostenol Brand-Pregma, Vetmate	1-5µg/kg OD, S/C, I/M for 5-10 Day			Goericke-Pesch, 2022
Cabergoline Brand-Cabgolin	5-15µg/kg OD, PO 5-7Day			Goericke-Pesch, 2022
Aglepristone Brand-Alizin	10-15mg/kg OD (S/C) for two conse- quence day (If abortion is in complete treat again in six day)		Efficacy of Aglepristone was found 88.5% and termination of pregnancy.	Goericke-Pesch, 2022; Fieni et al., 2006
Cabergoline + Dino- prost	Cabergoline 5µg/kg PO, OD for 5-7day Dinoprost 20-25µg/kg S/C, BID			Goericke-Pesch, 2022
Cabergoline + Cloprostenol	Cabergoline 5µg/kg PO, OD for 5-7day Cloprostenol (1µg/kg S/C, I/M OD or every other day Or Cabergoline 5µg/kg PO, OD for 5-7day Cloprostenol (5µg/kg S/C every other day Or Cabergoline- 15 µg/kg PO, OD Cloprostenol- 5µg/kg OD or every other day (S/C) till complete reabsorption	Less side effect observed in few cats	All treated animals aborted in 9 ± 1 days without any side effect. Complete reabsorption time-6- 8day	Goericke-Pesch, 2022; Onclin and Verste- gen, 1996; Kumar et al., 2022

Drug	Dose	Side effect	Note	Reference
Agleprestone + Misoprostol	Agleprestone 10mg/kg SC, OD for 2 consecutive day. Misoprostol 200µg /cat BID PO until start of abortion		Termination rate-100% Fetal expulsion time-69.8 ± 3.3 h	Serhan et al., 2018

Advice to the owner: This is a better animal welfare approach to terminating pregnancy after confirmation. The combined use of prostaglandin and anti-prolactin drugs causes complete reabsorption of the fetus in 6–8 days (Kumar et al., 2022). Use of cloprostenol that causes some side effects like panting and mydriasis occurs within minutes of drug administration and subsides within 1 to 3 hours (Kustritz, 2011). It can be prevented with the administration of atropine sulphate prior to cloprostenol injection. If the owner induces a termination 45 days after pregnancy and expects the expulsion of a dead fetus, they should compare the number of fetuses with those observed in the USG examination to confirm a complete abortion.

Advice to the owner after mis-mating

After administering therapeutic agents to mismated cats, there are minimal chances of females getting pregnant. The mis-mating can be prevented with proper care and management by their owners during the estrus period.

- To prevent unwanted mating, owners should ensure their pets are not let loose during estrus.
- Identify the females in estrus early by observing the following symptoms:
 - Vulvar swelling, sero-sanguinous vulvar discharge,
 - There has been an increased proximity toward males and an increased vocalization.
 - Excessive grooming and lordosis behaviour.
- If the owner is unwilling to raise a kitten, we recommend an ovario-hysterectomy to effectively prevent estrus and the ensuing mis-mating.

Care of the queen after mis-mating

- Provided adequate feed and water,
- Maintain hygiene,
- Take advice from a veterinary doctor.

If mating is not conformed, advise for vaginal smear examination for either presence or absence of spermatozoa in the vagina. The owner may be requested to wait until the confirmation of pregnancy to avoid unnecessary costs and side effects.

Supportive therapy: A mismated cat receiving hormonal therapy experienced severe side effects such as decreased appetite and depression. A prolonged therapy schedule resulted in immunosuppression and stress in the animal, which also increased the animal's susceptibility to secondary infections. Animals should receive supportive and anti-stress therapy to control such side effects.

These are some supportive therapies.

- Broad-spectrum antibiotics to prevent secondary bacterial infection.
- NSAIDS provide pain relief and anti-inflammatory effects.
- Multivitamins to increase energy levels and boost immunity.
- Antacids are used to relieve acidity.
- Vitamin C to prevent stress and increase feed intake.

Conclusion

In conclusion, medical termination of pregnancy is a common practice in cats to control reproduction and prevent unwanted pregnancies. Various medications and combinations of drugs can be used to induce abortion, with the goal of achieving high success rates and minimal side effects. It is important for pet owners to consult with a veterinarian to determine the best course of action for their cat's health and well-being.

Conflict of Interest

None

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