

## Reproductive emergencies in female cats

### *Emergências reprodutivas em gatas*

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**Abstract:** Reproductive emergencies are common in female cats, so, with the aim of contributing to the knowledge of the most frequent reproductive emergencies in this specie, a prospective study of patients treated at a University Veterinary Hospital was performed. All medical records of feline females, who were admitted like emergency related to the reproductive system, were analyzed. All data from epidemiological and clinical interest were registered. During 64 days, 20 female queen cats were monitored, and 13 had dystocia (65%; 13/20) and seven (35%; 7/20) pyometra. Many reproductive emergencies in the animals studied were related to contraceptive use. These findings should serve as a basis to veterinary clinicians to discourage this practice and encourage the neutering of females, thus providing quality care to clients and patients.

**Keywords:** genital tract; dystocia; feline; pyometra.

**Resumo:** Emergências reprodutivas são comuns em gatas, portanto, com o objetivo de contribuir para o conhecimento das emergências reprodutivas mais frequentes nesta espécie, foi realizado um estudo prospectivo de pacientes tratados em um Hospital Universitário Veterinário. Todos os registros médicos de fêmeas felinas, que foram admitidas como emergências relacionadas ao sistema reprodutivo, foram analisados. Todos os dados de interesse epidemiológico e clínico foram registrados. Durante 64 dias, 20 gatas foram monitoradas, sendo que 13 apresentaram distocia (65%, 13/20) e sete piometra (35%; 7/20). Muitas emergências reprodutivas nos animais estudados estavam relacionadas ao uso de anticoncepcionais. Esses achados devem servir de base para os clínicos veterinários para desencorajar esta prática e incentivar a castração de fêmeas, proporcionando cuidados de qualidade aos clientes e aos pacientes.

**Palavras-chave:** trato genital; distocia; felino; piometra.

**Resumen:** Las emergencias reproductivas son comunes en gatas, por lo tanto, con el objetivo de contribuir al conocimiento de las emergencias reproductivas más frecuentes en esta especie, se realizó un estudio prospectivo de pacientes tratados en un Hospital Universitario Veterinario. Todos los registros médicos de hembras felinas, que fueron admitidas como emergencias relacionadas al sistema reproductivo, fueron analizadas. Se registraron todos los datos de interés epidemiológico y clínico. Durante 64 días, 20 gatas fueron monitoreadas y 13 presentaron distocia (65%, 13/20) y siete piometra (35%; 7/20). Muchas emergencias reproductivas en los animales estudiados estaban relacionadas al uso de anticonceptivos. Estos hallazgos deben servir de base para los clínicos veterinarios para desalentar esta práctica y fomentar la castración de hembras, proporcionando cuidados de calidad a los clientes ya los pacientes.

**Palabras clave:** tracto genital; distocia; felino; piometra.

## **1 INTRODUCTION**

Reproductive diseases are common in the medical routine of dogs and cats in Brazil. This occurs for several reasons, including lack of castration when there is no interest in reproduction, unwanted pregnancies, lack of medical follow-up during pregnancy and the wrong use of contraceptives. In order for there to be a decrease in diseases linked to the reproduction of dogs and cats, providing welfare to the animals, responsible ownership measures are necessary. Such measures include several conducts, but in relation to the reproductive aspect, the most important is the castration of the animals when there is no interest in reproduction. However, many owners resist castration for several reasons, including fear that the animals will die in the surgical procedure, financial problems and cultural issues. In order to implement changes in these attitudes, managers and veterinarians must invest in educational measures.

In the feline species, the most frequent reproductive diseases are dystocias and pyometra. Such affections may present risk to patient survival if there is no rapid intervention.

The present study was motivated by the scarcity of information on the quantification and qualification of the reproductive emergencies diagnosed in female cats in the Brazilian veterinary services. With the determination of the type and frequency of these diseases, it is intended to contribute with veterinarians in relation to a faster and more accurate diagnosis, promoting an immediate and satisfactory treatment.

## **2 DYSTOCIA**

The feline pregnancy and parturition both vary in length, which is one why it may be challenging for the veterinarian working in this area. The mean gestation length in domestic cats is approximately 65 days (range 57–72 days), with the majority of parturitions (95–97%) occurring between 61 and 70 days (Holst, 2022).

To recognize a dystocia in the queen, it is necessary to determine the phases of a normal birth in the feline species, which is divided into three phases. In phase I (12-24 hours before delivery) the female may become

restless, changing her normal routine and may refuse to eat. Body temperature can drop to 36.7 ° C. The queen vocalizes, turns in circles and licks the vulva and at this moment begins the cervical opening even without the presence of contractions. In stage II (6-12 hours before delivery), the temperature returns to normal, the first fetus moves into the birth canal, rupture of the allantochorionic membrane may occur and have production of vaginal discharge (clear fluid). The contractions increase until fetal expulsion occurs. In stage III there is the expulsion of the placenta and resuscitation of the pup with umbilical cord rupture and ingestion of the placenta. The queen licks the kitten and shifts it and directs it to its own body (Conde, 2011; Holst, 2022).

Dystocia in female cat (queen) is defined as difficulty in the expel of the fetus or delivery of the kitten through the birth canal at the time (6-12 hours) of labor (Dar *et al.*, 2015). Dystocia may be a consequence of maternal or fetal factors that prevent expulsion (Montenegro, 2010). Maternal factors can be divided into morphological and physiological factors. Morphological factors include anatomical abnormalities mainly related to races and acquired conditions such as fractures and soft tissue neoformations. Physiological factors refer to uterine alterations of primary or secondary origin (Montenegro, 2010). Uterine changes of primary origin are lack of contraction of the myometrium that may be associated with a hypocalcemia or have a genetic component. Alterations of the secondary origin, most of the time, are due to myometrial fatigue after many unproductive contractions due to the presence of some factor that obstructs the birth canal (Conde, 2011). The fetal factors are poor presentation, excessive size, presence of malformation and fetal death. Prolonged gestation does not normally occur in the female cat, except in the case of dystocia or uterine inertia (Montenegro, 2010), but functional dystocia associated with uterine atony is the most frequent cause of dystocia in cats (Conde, 2011).

The most common cause of feline dystocia is uterine inertia, which accounts for approximately two-thirds of cases. Complete primary uterine inertia is diagnosed when there are no signs of stage 2 parturition after the due date is passed, whereas partial primary uterine inertia is diagnosed when the queen reaches stage 2 parturition but uterine contractions are weak

and delivery of one or more fetuses fails. Because of the varying gestation length in cats, complete primary inertia can be difficult to diagnose (Holst, 2022). A significant association has been described between dystocia and both small and large litter sizes (Holst *et al.*, 2017).

In general, veterinary intervention is indicated when labour does not start despite the queen having passed the due date (primary uterine inertia), if there is a prominent discoloured discharge before birth of the first kitten, When strong abdominal contractions are evident but no kitten is born within 30 mins, when weak contractions are evident for more than 4 h with no kitten born, when the queen shows signs of distress, or any time during parturition if there is a prominent bloody discharge (Holst, 2022).

The diagnosis of dystocia is based on a clinical history that reveals a very long delivery time (more than 24 hours in phase I of labor, more than 4 hours since the beginning of phase II or more than 30 minutes from the beginning of active contractions), or the birth of an abnormal fetus, presence of systemic disease, or abnormal vulvar secretion (Conde, 2011).

The management of dystocia in feline females is usually done by cesarean section (Conde, 2011; Holst *et al.*, 2017; Montenegro, 2010; Silveira *et al.*, 2013), since medical approach has a success rate of around 20 to 40% (Montenegro, 2010). To avoid fetal mortality, caesarean section is recommended 71 days after mating if there are no signs of impending parturition (Holst, 2022). It is worth noting that most cat owners in Brazil request the castration of the animals submitted to cesarean due to the fact that most cats are mixed breed and belong to deprived families (Silveira *et al.*, 2013).

### **3 PYOMETRA**

The pyometra, which is an accumulation of purulent secretion inside the uterus (Coggan *et al.*, 2008; Smith, 2006), and involves both hormonal and bacterial factors (Holst, 2022). Pyometra is a life-threatening condition in cats. The risk increases with age. There is a significant variation between breeds, indicating a hereditary component (Holst, 2022).

The disease can result from the colonization of the uterus by opportunistic bacteria, components of the usual microbiota, isolating, in most

cases, *Escherichia coli*, *hemolytic Streptococcus*, *Staphylococcus*, *Klebsiella*, *Pasteurella*, *Pseudomona*, *Proteus*, and *Moraxella* (Conde, 2011). These bacteria proliferate due to progesterone action during diestrous, especially in middle-aged animals, whereas in younger animals it may be related to the exogenous administration of hormones for estrous suppression and pregnancy prevention (Coggan *et al.*, 2008; Silveira *et al.*, 2013).

Although the cat is generally considered an induced ovulator, spontaneous ovulations, followed by a luteal phase, occur regularly. Pyometra is typically seen during the luteal phase (Holst, 2022), but may also be diagnosed in queens treated with progestins (Coggan *et al.*, 2008; Holst, 2022; Silveira *et al.*, 2013). Occasionally, pyometra occurs in spayed queens with ovarian remnants, usually after signs such as estrus behavior indicating endocrine activity. Rare cases may occur in conjunction with uterine neoplasia (Holst, 2022).

Common clinical signs include vaginal discharge, anorexia, lethargy, abdominal distension, pyrexia and polyuria/polydipsia (Holst, 2022). Clinically, the pyometra presents with the closed or open cervix (Evangelista *et al.*, 2011; Little, 2005; Silveira *et al.*, 2013; Stone, 2007), the former being related to higher mortality, while the latter is the most frequent in queens (Silveira *et al.*, 2013). In cases of closed pyometra or in queens with meticulous cleaning habits, a vaginal discharge may not be evident (Holst, 2022).

The diagnosis of this condition is based on anamnesis, clinical signs, ultrasonography and radiography (Hagman *et al.*, 2009; Holst, 2022).

Surgical treatment (ovariohysterectomy) is usually preferred as it is safe and effective (Evangelista *et al.*, 2011; Holst, 2022; Silveira *et al.*, 2013), removing the infectious material and preventing recurrence. In breeding animals, or when anesthesia or surgery imposes an increased risk, medical treatment is an option (Holst, 2022).

Candidates for medical treatment should be selected carefully – this is not the treatment of choice for queens with serious illness. Because pyometra is a progesterone dependent condition, the fundamental aim of medical treatment is to prevent the effect of progesterone. This can be achieved by administering a steroid receptor blocker, such as aglepristone (Holst, 2022).

#### **4 METHODOLOGY**

A prospective study of queens with reproductive urgencies attended at a University Veterinary Hospital (UVH) was carried out in the period corresponding to one trimester. The following diseases were considered as reproductive urgencies: dystocia, pyometra, vaginal prolapse, uterine prolapse, vaginal hyperplasia, uterine torsion, puerperal tetany, metritis and mastitis.

In the referred period 20 female cats whose tutors sought the UVH were followed. After being screened (pre-evaluation) in which they were classified as emergency cases, the animals were attended by the veterinarian on duty, and underwent physical exams. Complementary tests (laboratory and imaging) were requested.

After the diagnosis, with the established condition of reproductive urgency, the animals were referred immediately to the surgical center or hospitalized. The hospitalization was done to improve the clinical picture of the animal, allowing surgery to be performed according to the reproductive urgency that the animal presented.

A record was prepared to control the female cats treated at UVH and diagnosed with some reproductive urgency. All epidemiological and clinical data were registered in individual records, which enabled the analysis of the data through the determination of observed percentage frequencies.

#### **5 RESULTS AND DISCUSSION**

During the study period, 20 cats were followed with reproductive urgencies. Taking into account that holidays and weekends were not included in the study interval and that the study interval comprised 64 days, one can consider the occurrence of a reproductive urgency in cats every three days in the UVH. No similar data were found in the literature for comparison, but the data draws attention to the high frequency. In this way, hospitals and clinics that provide this type of service must be constantly prepared to attend reproductive cases in this specie.

During the first month of the study four queens were admitted to the UVH with reproductive urgencies, the number increased to seven cats

the following month. In the last analyzed month, nine female cats, with reproductive urgencies were observed. Therefore a gradual increase in the number of cases was observed, and in the last month covered by the survey more than doubled the number of reproductive emergencies in queens compared to the first month. This increase can be explained by the increase in the number of felines seen in veterinary clinics and hospitals in Brazil (Genaro, 2010).

The most frequent reproductive urgency in queens was dystocia (13; 65%) (Figure 1 e 2), a result similar to other studies involving reproductive affections in cats (Silva *et al.*, 2012; Silveira *et al.*, 2013). The high casuistry of this condition may be related to maternal and fetal factors that can contribute to dystocia (Holst, 2022; Montenegro, 2010; Silva *et al.*, 2012), among them poor nutrition (Prestes; Landim-Alvarenga, 2017) since many owners of cats are needy owners (Silveira *et al.*, 2013). In addition, the indiscriminate use of injectable progestogens may lead to dystocia (Holst, 2022; Silveira *et al.*, 2013) and this is a common practice in Brazil both in bitches and in queens (Araújo *et al.*, 2014; Silveira *et al.*, 2013; Togni *et al.*, 2013), and it is not different in the city where the service analyzed in this study is located. It was detected that in eight queens with dystocic delivery, the owners used this drug.

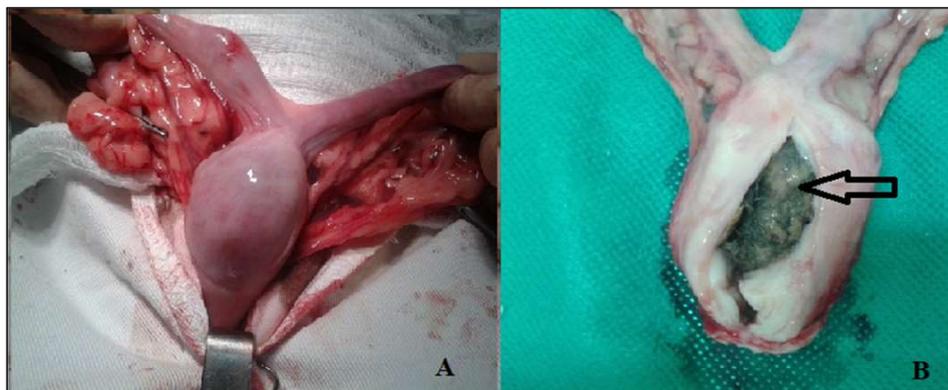
Even if it has not been registered in the medical files, it is likely that the majority of cases of dystocia observed were primary uterine inertia, as this is one of the most common causes of dystocia in cats (Holst, 2022; Smith, 2006).

Figure 1- Female cat with dystocic parturition



Source: The authors.

Figure 2 - Uterus of a female cat with dystocic parturition submitted to cesarean section. A: Appearance of the uterus after opening of the abdominal cavity; B: Presence of macerated fetus (arrow) after opening of the uterus already outside the abdominal cavity



Source: The authors.

Pyometra is more common in bitches than in queens (Evangelista *et al.*, 2011), due to the fact that, in female cats, ovulation is induced by copulation, so queens are not exposed to increased progesterone concentration so often (Holst, 2022; Silveira *et al.*, 2007), so they have less pyometra than bitches. However, there were seven cases of pyometra in cats in this study (35%; 7/20), demonstrating that the disease is common in female cats (Borges; Coltro; Quessada, 2022; Silveira *et al.*, 2013). This result may be related to the use of contraceptives, which are proven to cause pyometra in queens (Borges; Coltro; Quessada, 2022; Silveira *et al.*, 2013). Pyometra affects female cats from 6 to 11 years of age with a mean of nine years (Evangelista *et al.*, 2011), however, in this study, five of the seven cats that presented the disease were aged between seven months and one year. The fact that the disease occurs in such young animals is probably related to the administration of contraceptives (Silveira *et al.*, 2007; Silveira *et al.*, 2013), and the use of contraceptives was detected in four cats presenting the disease in this study.

Although there is drug treatment for pyometra, the most effective treatment is ovariohysterectomy. In a study comparing drug therapy with surgical treatment, it was shown that the success rate in drug treatment was 60% and surgical treatment was effective in 100% of cases (Misk; El-Sherry, 2020). Thus, the treatment of cats with pyometra in the present study was ovariohysterectomy and all cats recovered completely.

In the feline species, other diseases can be considered reproductive emergencies, including uterine prolapse (Fernandes *et al.*, 2016; Holst, 2022; Lopes *et al.*, 2015), eventration of gravid uterus (Lima *et al.*, 2012, Silva *et al.*, 2012), uterine torsion (Hendy; Elgohary, 2023), metritis (Fernandes *et al.*, 2016; Holst, 2022), fetal death (Fernandes *et al.*, 2016) and mastitis (Holst, 2022). However, these occurrences were not observed in this study, probably due to the reduced time of observations and the fact that these diseases are not frequent in the feline specie (Conde, 2011).

## **6 CONCLUSION**

It was concluded that in this service, during the analyzed period, the reproductive emergencies in queens were dystocia and pyometra, and

most of the cases occurred due to the use of contraceptives. Such findings should serve as a basis for veterinary clinicians to discourage such practice. In addition, veterinary clinicians should guide the owners of female cats, encouraging castration and gestational follow-up with routine ultrasound examinations, avoiding later complications, and providing quality care to clients and patients.

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GENARO, G. Gato doméstico: futuro desafio para controle da raiva em áreas

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