

**Artigo Original**

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**PALAVRAS-CHAVE**

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**Reproductive emergencies in bitches****Emergências reprodutivas em cadelas****ABSTRACT**

The cases of reproductive emergencies are frequent in female dogs, and the most frequent reproductive disorders are dystocia and pyometra, both considered as emergencies. A prospective study was conducted during one year between the dogs treated in a Teaching Veterinary Hospital (TVH). Were followed 36 cases, and no deaths occurred. The most frequent disease was pyometra representing 58.33% of the cases (21/36). Among the 21 cases reported, 85.71% were open pyometras (18/21). In all cases of pyometra the treatment was surgical, and was performed ovariohysterectomy (OH). After pyometra, the dystocia was the most common reproductive emergency in female dogs, and were recorded 13 cases of this condition (36.11%; 13/36). In most cases it was not registered the cause of dystocia (69.24%; 9/13), but in four cases (30.76%; 4/13) was considered as an etiologic factor, primary uterine inertia. In most cases (10/13; 76.92%) was performed caesarean section as treatment. A case of mastitis treated with antibiotics with full recovery was registered. Although vaginal hyperplasia is not considered an emergency, a case of this disease was included study. The prolapsed vaginal mucosa was very swollen, with risk of infection, myiasis and self-trauma and urethral obstruction, requiring immediate patient care. The treatment adopted was OH with complete recovery of the animal. It was concluded that the most frequent reproductive emergencies were pyometra and dystocia.

**RESUMO**

Os casos de emergências reprodutivas são frequentes nas fêmeas caninas, sendo que as afecções reprodutivas mais frequentes são distocias e piometras, ambas consideradas emergências. Foi realizado um estudo prospectivo durante um ano, incluindo cadelas atendidas em um Hospital Veterinário Universitário. Foram acompanhados 36 casos, sendo que não ocorreram óbitos. A enfermidade mais frequente foi a piometra, representando 58,33% dos casos (21/36). Dentre os 21 casos descritos, 85,71% eram piometras abertas (18/21). O tratamento instituído foi o cirúrgico em todos os casos, tendo sido realizada ovariohisterectomia (OH). Depois da piometra, o parto distócico foi a emergência reprodutiva mais frequente em cadelas, sendo que foram registrados 13 casos desta condição (36,11%; 13/36). Na maior parte dos casos, não foi registrada a causa da distocia (69,24%; 9/13), mas em quatro casos (30,76%; 4/13) foi considerado como fator etiológico inércia uterina primária. Na maioria das ocorrências (10/13; 76,92%) foi realizada cesariana como tratamento. Foi registrado um caso de mastite, tratada com antibiótico, com completa recuperação. Embora hiperplasia vaginal não seja considerada emergência, um caso desta doença foi incluído no estudo. A mucosa vaginal prolapsada estava muito edemaciada, com risco de infecção, miíase, auto trauma e obstrução uretral. Portanto, foi necessário atendimento imediato que constou de OH com recuperação completa do animal. Concluiu-se que as emergências reprodutivas mais frequentes foram piometra e distocia.

## INTRODUCTION

Reproductive emergencies are frequent in female dogs, and the most frequent are dystocia and pyometra (SILVEIRA et al., 2013). Other reproductive emergencies in bitches include uterine prolapse (Rocha et al., 2010), uterine torsion (KACPRZAK et al., 2014), puerperal tetany (MURTHY et al., 2014), metritis (FRESNO et al., 2014) and mastitis (OLIVEIRA et al., 2015).

Pyometra, which is an accumulation of purulent secretion within the uterus (CONTRI et al., 2015), results from colonization of the uterus by opportunistic bacteria that are components of the usual vaginal microbiota (TRAUTWEIN et al., 2017). Such bacteria proliferate due to progesterone action during diestrus, especially in middle-aged animals, while in younger animals it may be related to exogenous estrogen administration for estrus suppression and pregnancy prevention (SILVEIRA et al., 2013).

Clinically, pyometra presents with the closed or open cervix (EVANGELISTA et al., 2010; SILVEIRA et al., 2013; TRAUTWEIN et al., 2017), and the first is related to higher mortality (SILVEIRA et al., 2013) with worse prognosis (TRAUTWEIN et al., 2017). The diagnosis of this condition combines anamnesis, clinical signs, ultrasound and radiography (CONTRI et al., 2015; TRAUTWEIN et al., 2017), being the most effective surgical treatment (ovariohysterectomy - OH) (EVANGELISTA et al., 2010; SILVEIRA et al., 2013; CONTRI et al., 2015; TRAUTWEIN et al., 2017).

Abnormal parturition (dystocia) occurs when there is failure to start the parturition at the right time or when there is a problem in normal expulsion of the fetuses through the birth canal during parturition, after beginning the labor (SMITH, 2012). The dystocia in bitches occurs due to fetal or maternal factors (OLUWATOYIN; FAYEMI, 2011; RUNCAN; SILVA, 2018; SMITH, 2012). Several maternal and fetal factors may contribute to dystocia, with 75% of bitches dystocia being of maternal origin and 25% of fetal origin (OLUWATOYIN; FAYEMI, 2011; RUNCAN; SILVA, 2018; SMITH, 2012).

The diagnosis of dystocia is based on clinical history revealing a very long parturition time or the birth of an abnormal fetus, presence of systemic disease or abnormal vulvar secretion (HENRIQUE et al., 2015; RUNCAN; SILVA, 2018).

Treatment of dystocias depends on the bitch's physical condition, the number of fetuses involved, the cause and the eases available (MURTHY et al., 2014). Oxytocin is the drug of choice in drug treatment (HENRIQUE et al., 2015; OLUWATOYIN; FAYEMI, 2011; RUNCAN; SILVA, 2018), but non-conservative caesarean sections are currently performed in most bitches (SILVEIRA et al., 2013).

Mastitis is the bacterial inflammation of one or more mammary glands, secondary to birthing in bitches (BALACI et al., 2015). The bacteria involved in the process commonly penetrate the duct as a result of breastfeeding, trauma, poor hygiene and hematogenous spread. The glands involved may be hot, sore, firm and with hemorrhagic or purulent discharge. In severe cases systemic signs such as fever, anorexia and lethargy occur (BALACI et al., 2015). Mastitis may progress to necrosis,

abscess, and gangrene of the mammary glands (OLIVEIRA et al., 2015). The diagnosis is made based on history and clinical examination. It is suggested that the milk from infected glands be examined in the laboratory (BALACI et al., 2015). The most commonly involved bacteria are *Escherichia coli*, *Staphylococci* and beta-hemolytic *Streptococci* (VASIU et al., 2015). For treatment broad spectrum antibiotics should be used (OLIVEIRA et al., 2015).

The present study aimed to analyze reproductive emergencies in female dogs diagnosed in a Teaching Veterinary Hospital (TVH). The determination of reproductive diseases diagnosed routinely allows veterinarians to have adequate information on the subject, allowing faster and more accurate diagnosis, promoting appropriate, immediate and more satisfactory treatment.

## MATERIAL AND METHODS

This work was approved by the ethics committee of the institution where it was carried out with the protocol 27016/2015.

A prospective study was carried out for one year, and all cases of reproductive emergency in bitches attended to the TVH were recorded. After being considered as urgent cases by the veterinarian on duty, the animals were submitted to clinical examination and complementary exams (laboratory and imaging). After the diagnosis was made, the animals were referred for clinical or surgical treatment, depending on the condition. The cases of pyometra were diagnosed by clinical signs (temperature, abdominal pain, vomiting, polyuria, vaginal discharge) and by ultrasound. In some animals with pyometra blood count was performed. When the female dogs presented dystocia, a rapid clinical examination was performed to check for pelvic dilation and the animals was referred for ultrasound examination to verify fetal viability. Once pelvic dilation and fetal viability were verified, oxytocin-based drug treatment was instituted. Observing fetal death or insufficient pelvic dilation, the animals were immediately referred for cesarean section. Only a female dog that was treated with drugs managed to give birth. Two bitches who were treated with oxytocin did not respond to drug treatment and were referred for cesarean section. The anesthetic protocol used for OH in the pyometras consisted of acepromazine (0.05 mg/kg) and morphine (1mg/kg) by intramuscular as pre-anesthetic medication. After 10 minutes, anesthetic induction was performed with intravenous 1% propofol (5mg/kg). After orotracheal intubation, anesthesia was maintained with isoflurane in a semi-closed circular system for animals larger than 7kg and Rees-Baraka non-re-inhalation system for dogs smaller than 7kg.

In dystocias, propofol 1% (5mg / kg / IV) was also used for induction and isoflurane for maintenance. In these cases, analgesia was performed with fentanyl citrate 0.05mg/ml (0.002mg / kg), half dose before fetal withdrawal and half dose after cesarean section.

In all animals with pyometra and dystocia, ovariohysterectomy (OH) was performed using the block removal technique (removal of ovaries and uterus without uterine opening) (SILVEIRA et al., 2013). After removal,

the uterus was opened. In live fetuses, umbilical cord ligation and secretion cleaning were performed.

After surgery, all animals were hospitalized, and fluid therapy with lactate ringer was made, 12/12-hour cephalothin 30mg/kg IV, meloxicam 0.1mg/kg 24/24 hour IV and tramadol hydrochloride 2mg/kg. 8/8 hour IV. This treatment was performed during hospitalization, which lasted 48 hours after surgery. After this period the bitches were discharged. For home medication, cephalixin (30mg/kg) was prescribed twice a day for five days and dipyrone (40 mg/kg) three times a day for five days. Ten days after surgery, the skin stitches were removed.

In this study we recorded a case of mastitis (2.78%; 1/36) (Table 1) of a non-defined race female dog with a history of recent parturition (Figure 2A). The main signs presented were hyperemia, anorexia, mammary gland edema, and local pain. The diagnosis of the disease was based on anamnesis and clinical examination. The treatment was performed with cephalixin 30mg/kg twice a day for 10 days, and topic iodine tincture in the mammary glands was used. A case of the vaginal hyperplasia in a boxer bitch was included in the present study (2.78%; 1/36). (Figure 3A). The diagnosis was established mainly by clinical signs and anamnesis. The treatment adopted was OH and replacement of prolapsed mass (Figure 3B).

All epidemiological and clinical data were registered in individual records, which enabled the descriptive analysis of the data.

## RESULTS AND DISCUSSION

Thirty-six cases of female dogs with reproductive emergencies in TVH were followed up. Most of these attendances were pyometra representing 58.33% of the cases (21/36) (Table 1). Pyometra is a common disease in female dogs (EVANGELISTA et al., 2010; SILVEIRA et al., 2013), and in another study with the same theme, pyometra in the species had a similar frequency (VOLPATO; LOPES, 2015).

Of the 21 cases described, 85.71% were open pyometras (18/21) and 14.29% were closed pyometras (3/21). Such data are similar to other studies that also report open pyometra as more frequent in bitches (EVANGELISTA et al., 2011; GORRICHIO; CAMPOS, 2012).

In this research, it was observed that the age of female dogs with pyometra ranged from three to 18 years, and 42.86% of the female dogs (9/21) were older than seven years, the age in which the disease in female dogs is more frequent (EVANGELISTA et al., 2010; SILVEIRA et al., 2013; TRAUTWEIN et al., 2017). In five clinical records (23.81%) there was no record of race. Pitbull, Pinscher and Rottweiler were represented with one case in each. However, most female dogs with pyometra were of no defined breed (61.91%; 13/21), as did other casuistry in Brazil (EVANGELISTA et al., 2011; TRAUTWEIN et al., 2017).

In most of the cases registered in this study, no complementary exams were performed due to the emergency nature of the cases. In addition, such examinations were not performed, in most cases, due to financial limitations. Many bitches of the study were shelter animals. Such examinations were performed only

on five animals all with pyometra. In two bitches, anemia was observed and leukocytosis occurred in three female dogs. Hematological changes observed (anemia and leukocytosis) may occur in cases of pyometra (EVANGELISTA et al., 2010).

Biochemical alterations (urea and creatinine) are frequent in female dogs' pyometras (EVANGELISTA et al., 2011; SANTOS et al., 2013; TRAUTWEIN et al., 2017). However, in the five cases in which biochemical profiling was performed, the results of urea and creatinine were normal for the species. Depending on the clinical condition, dogs with pyometra may present normal urea and creatinine levels (EVANGELISTA et al., 2010; SANTOS et al., 2013). Clinically, these bitches had no serious systemic signs and had open pyometra. This type of pyometra appears to be less severe than closed pyometra (SILVEIRA et al., 2013; TRAUTWEIN et al., 2017).

In the cases of pyometra diagnosed here, the treatment instituted was surgical in all cases, and the ovariectomy (OH) was performed. In a study conducted with 20 female dogs submitted to surgical treatment, there is no death record (EVANGELISTA et al., 2010), as happened in the female dogs of the present study. However, death may occur in female dogs with pyometra (TRAUTWEIN et al., 2017). High mortality rates are observed in those cases that develop peritonitis. Myocardial injury secondary to inflammation, disseminated bacterial infection or infarctions and endotoxaemia are suspected to be the potential contributing factors in unanticipated deaths (SINGH et al., 2020). These conditions were not detected in the bitches of the present study.

Cephalixin in postoperative of the pyometra (58.09% of cases; 12/21) was the most commonly used antibiotic because of its efficacy in combating *Escherichia coli*, the most commonly involved organism in the etiology of pyometra (KALENSKI et al., 2012). Other studies report the use of the same drug in this disease with good results (GORRICHIO; CAMPOS, 2012).

After of the pyometra, dystocic parturition was the most frequent reproductive emergency in female dogs, with 13 cases of this condition (36.11%; 13/36) (Table 1). This case series is similar to that of another service in Brazil (SILVEIRA et al., 2013).

Bitches with no defined breed were the most affected by dystocia (53.84%; 7/13). The mean age of female dogs with dystocic delivery in this study was 4.62 years, and such data are similar to those of other research (BERGSTROM et al., 2006).

In most cases of dystocic parturition (69.24%; 9/13) it was not possible to identify the cause of dystocia. Some possible causes of causing dystocia in bitches such as obstructive processes in the vaginal canal and anatomical anomalies (RUNCAN; SILVA, 2018) have not been observed in bitches. In primary uterine inertia, which is common in female dogs, uterine contractions do not occur (OLUWATOYIN; FAYEMI, 2011; RUNCAN; SILVA, 2018; SMITH, 2012). However, these bitches showed contractions that were unproductive. Poor fetal presentation can also be a common cause of dystocia in female dogs (RUNCAN; SILVA 2018). However, they were not evidenced in the present study. Another common cause of dystocia in female dogs is prolonged delivery (RUNCAN; SILVA, 2018). However, in most dystocia bitches in the

study, this information was not possible. Thus, it was not possible to identify the cause of dystocia in these female dogs. In four cases (30.76%; 4/13) the cause of dystocia was considered as primary uterine inertia. Such a cause is common in dystocic bitch births (OLUWATOYIN; FAYEMI, 2011; RUNCAN; SILVA 2018; SMITH, 2012). Primary uterine inertia is the inability of the uterus to develop and maintain the contractions necessary for expulsion of the fetus. Such cause is considered to be of maternal origin (OLUWATOYIN; FAYEMI, 2011; RUNCAN; SILVA 2018; SMITH, 2012), and 75% of the bitches dystocias is of such origin (SMITH, 2012; RUNCAN; SILVA 2018).

In three cases of dystocia (23.07%; 3/13) drug treatment was performed using oxytocin as recommended in the literature (OLUWATOYIN; FAYEMI, 2011; RUNCAN; SILVA, 2018). However, such treatment is only performed when there is pelvic dilation (RUNCAN; SILVA, 2018; SMITH, 2012), as was the case of the female dogs in question. Despite treatment, oxytocin was not effective for fetal expulsion in two cases, probably due to myometrium fatigue (OLUWATOYIN; FAYEMI, 2011; SMITH, 2012). Such bitches were referred for caesarean section, because in the absence of response to drug treatment, caesarean section is indicated (MURTHY et al., 2014). The female dog that responded to oxytocin treatment expelled all fetuses, and the animal was discharged and castration was recommended.

In the two bitches in which oxytocin did not trigger parturition and who underwent cesarean section, uterine rupture occurred (Figure 1). This occurrence is possible when using this drug as an inducer of parturition in female dogs (HUMM et al., 2010; RUNCAN; SILVA 2018). Thus, it is suggested that bitches diagnosed with dystocia should be immediately referred for cesarean section without the use of drugs to induce labor. Cesarean section performed at the appropriate time and with careful anesthesia is more comfortable for both mother and puppies and has less risk than repeated and time-consuming measures of assistance to conservative parturition (BIANCHI et al., 2011).

In 76.92% of the dystocia cases (10/13), the primary treatment was surgical (cesarean section). Most authors recommend cesarean section in bitches dystocia (SILVEIRA et al., 2013; MURTHY et al., 2014) to decrease patient mortality and to ensure welfare of the animals (BIANCHI et al., 2011). Corroborating such data, in cases where caesarean section was performed, no maternal deaths occurred as reported in another study (METCALFE et al., 2014).

In all OH performed for dystocia treatment, the bloc technique was used (SILVEIRA et al., 2013), meaning the removal of all organs (ovaries and uterus) without opening of the uterus inside the abdominal cavity. In cases of fetal death and where uterine integrity and health are questionable, this technique is indicated (SILVEIRA et al., 2013). Most of the fetuses were dead. Neonatal mortality is very high in dystocic bitch deliveries, reaching up to 90% (SOUZA et al., 2017).

The 12 female dogs that underwent cesarean section were castrated. Spaying is an important conduct in responsible dog ownership, preventing disease and risky behaviors such as escape and wandering (VOORWALD et al., 2013).

The anesthetic protocol used in the surgical procedures of the female dogs in this study is considered appropriate for both animals with pyometra (MAMÃO et al., 2015) and for cesarean section (WALLER et al., 2014).

Cases of mastitis in female dogs are uncommon (ARAÚJO et al., 2011), but in this study we recorded a case (2.78%; 1/36) (Table 1) of a non-defined race female dog with a history of recent parturition (Figure 2A), corroborating other authors (ARAÚJO et al., 2011; OLIVEIRA et al., 2015). The main signs presented were hyperemia, anorexia, mammary gland edema, and local pain, as recorded in another study (BALACI et al., 2015). The diagnosis of the disease was based on anamnesis and clinical examination. As complementary exams can be used cultivation and microbiological identification, combined with the in vitro microbial sensitivity test (antibiogram) (BALACI et al., 2015; OLIVEIRA et al., 2015). However, such tests were not performed on this female dog for economic reasons as it was an animal without a owner living in shelter. However, the disease can be diagnosed through clinical examinations and anamnesis (OLIVEIRA et al., 2015) as performed in the case in question.

Based on other studies (ARAÚJO et al., 2011; OLIVEIRA et al. 2015), in which the main isolated agent was of the genus *Staphylococcus spp*, we chose cephalixin 30mg/kg twice a day for 10 days, suggested in the literature by others authors (GRAHAM; TAYLOR, 2012). As supportive therapy, local iodine tincture was used (OLIVEIRA et al. 2015). This was shown to be efficient and appropriate for this case, as there was complete recovery of the patient (Figure 2B).

Although vaginal hyperplasia is not considered an emergency, a case of this disease was included in the present study (2.78%; 1/36). Such conduct was due to the fact that the prolapsed vaginal mucosa was very swollen, with risk of infection, myiasis and self-trauma and urethral obstruction, requiring immediate patient care (Figure 3A). The female dog in this case belongs to the Boxer breed, which is one of the most affected by this condition (SONTAS et al., 2010; FRARI; CAMARGO, 2013). The owner reported that the dog was in estrous, and vaginal hyperplasia may occur at this stage of the estral cycle (SONTAS et al., 2010). The diagnosis was established mainly by clinical signs and anamnesis as observed in the literature (SONTAS et al., 2010). The treatment adopted was OH, eliminating the source of estrogen (SONTAS et al., 2010) and replacement of prolapsed mass (Figure 3B) with complete recovery of the animal.

## CONCLUSION

During the analyzed period, the most frequent reproductive emergencies in the female dogs treated at TVH were pyometra and dystocia. One case of mastitis and one of vaginal hyperplasia were also recorded.

In dystocia of bitches it is suggested to indicate cesarean section as the first option to decrease mortality and to ensure welfare of the patient. In these cases, cesarean section followed by OH (radical caesarean section) is recommended.

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