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## A retrospective study of bitches with pyometra, medically treated with aglepristone<sup>☆</sup>



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### ABSTRACT

Pyometra is a common and life-threatening disease of intact bitches caused by hormonal influence of the uterus in combination with bacterial infection. The treatment of choice is ovariectomy, but several purely medical options are available. Common drugs used for medical treatment in combination with antimicrobials are progesterone receptor blockers, prostaglandins, and dopamine agonists. The aim of this study was to evaluate long-term recovery and fertility after treatment with the progesterone receptor blocker aglepristone in bitches with pyometra. Data from 28 bitches with pyometra, admitted to the University Animal Hospital, Swedish University of Agricultural Sciences, during a 9-year period, were studied retrospectively and followed up by telephone interviews with the owners. The bitches had been treated with aglepristone at a dose of 10 mg/kg on a median of four occasions. All bitches had also been treated with antimicrobial drugs for a mean duration of 23 days, the most frequently used being enrofloxacin. *Escherichia coli* were the most commonly isolated bacteria from cranial vagina. The outcome was assessed for up to 6 years after treatment. The success rate, determined as restored clinically healthy status, was 75% (21/28 bitches), and the recurrence rate of disease was 48% (10/21 bitches). The mean time until recurrence was 10.5 months after the end of treatment. After treatment, 69% (9/13) of the mated bitches produced puppies. Of the seven bitches that did not have a successful treatment, six were ovariectomized and one was euthanized. In conclusion, medical treatment with aglepristone in combination with antimicrobial therapy was successful in 75% of the bitches studied and the recurrence rate was 48%.

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### 1. Introduction

On average, 19% of all insured Swedish bitches are diagnosed with pyometra before the age of 10 years [1]. In Sweden, the dog population is mainly intact [2], which is why pyometra is a frequent disorder in comparison to the situation in countries where most bitches are spayed [3]. The pathogenesis of pyometra is not fully understood, but the influence of estrogen followed by subsequent progesterone stimulation during a long period of time (metoestrus) [4], in combination with

bacterial infection, is believed to cause the disease. The bacteria originate from the normal flora of each bitch, and (*E. coli*) is the most common isolate from the uterus [5–9].

Ovariectomy is the treatment of choice for pyometra and is considered to be safe and effective [10]. To maintain fertility or if surgery or anesthesia is to be avoided, several medical treatment alternatives are available. Examples of drugs that can be used for medical treatment of pyometra include progesterone-receptor antagonists (aglepristone and mifepristone), prostaglandins (dinoprost and cloprostenol), dopamine agonists (cabergoline), or different combinations of these drugs [11–15]. Few studies have evaluated the long-term outcome after medical treatment, and for aglepristone, the time of follow-up evaluation varies from after the following estrus [16,17],

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after 1 year [18], after 2 years [19], or up to 54 months after treatment for a few bitches [13]. In one of the studies, the authors maintained contact with three successfully treated bitches for up to 6 years after treatment [19]. Although medical treatment of pyometra has been described previously in several studies, most studies contain a limited number of bitches, and so far there is no large study combining all the results of the available studies. Therefore each individual dog that is treated and the results reported still contribute to the current mass of knowledge of which bitches to select for this type of treatment (medical as opposed to surgical). In Sweden, medical treatment is rarely performed and is performed only when the general condition of the bitch is mildly or moderately affected. This situation differs from in other countries where medical treatment is used for severely affected bitches including those with peritonitis (F. Fieni, presentation, 16th EVSSAR congress, Toulouse, France, 2013). It is plausible that the success rate would be higher if only less severely affected bitches are selected for medical treatment. Treatment outcome may also differ depending on varying antimicrobial resistance in different countries, but few studies focus on the choice of antimicrobial drugs used as adjunctive treatment of pyometra [6,8]. Until now, the overall outcome after aglepristone treatment of pyometra in Sweden has not been studied.

The aim of this study was to investigate the long-term outcome, that is, clinical recovery and fertility, after medical treatment with aglepristone in bitches with pyometra in Sweden.

## 2. Materials and methods

### 2.1. Study design and animals

A retrospective study was performed at the Department of Clinical Sciences, Swedish University of Agricultural Sciences, Uppsala, Sweden, using data on bitches with pyometra admitted to the University Animal Hospital (UDS), Swedish University of Agricultural Sciences, that were medically treated with aglepristone (Alizin vet, Virbac, Stockholm, Sweden). Data were collected from all medically treated bitches diagnosed with pyometra from the time when aglepristone was registered for this purpose in Sweden from June 2004 until February 2013.

### 2.2. Data collection

The data system of UDS was used to identify bitches with the diagnostic code for pyometra ( $n = 33$ ) combined with aglepristone. One bitch was excluded because it was destined for surgical treatment and treated with aglepristone for 1 day (stabilized before surgery). Four bitches were excluded due to simultaneous treatment with PGF $2\alpha$  or oxytocin.

All owners were interviewed by telephone by the first author (LR) from September to October 2013 to retrieve information of subsequent history, fertility, and long-term outcome. For more specific information about breeding, the Swedish Kennel Club (SKK) registry was used to obtain the exact dates of parturition and number of registered puppies.

The first day a bitch was treated with aglepristone is in this study was referred to as “Day 1.” Any previous days are referred to as “Day –1,” “Day –2,” and so on (i.e. there was no Day 0).

### 2.3. Studied variables

Case history data were based on the owners' observations before and during treatment at the UDS. Clinical examination findings were based on the veterinarian's physical examination. Blood samples were obtained from 21 of the 28 bitches between Days –3 and 2 and in one bitch on Days –10. In nine cases, bacterial culture results of sterile cotton swab (Culturette, Becton–Dickinson, Stockholm, Sweden) samples from the cranial vagina were available. Culturing was performed at the Section of Bacteriology, National Veterinary Institute (SVA), Uppsala, Sweden (seven bitches); at Skövde Animal Clinic, Skövde, Sweden (one bitch); and at Enköpings Animal Clinic, Enköping, Sweden (one bitch). The samples were collected at the start of aglepristone treatment (in two cases the culturing was performed 11 and 21 days before aglepristone treatment started). In two bitches, bacterial culture results from urine samples were available, as performed at the National Veterinary Institute (SVA), Uppsala, Sweden, and University Animal Hospital (UDS), Uppsala, Sweden. Adverse effects observed were based on clinical signs observed by the veterinarian in charge at UDS and information retrieved from the owners before and after treatment.

### 2.4. Statistical analysis

Successful treatment was defined as return to a clinically healthy status. Recurrence was defined as recurrence of the disease. Success rates and recurrence rates were compared between younger ( $\leq 5$  year old) and older ( $> 5$  year old) bitches using Fisher's exact test (Minitab 16, Minitab Inc., State College, PA, USA). Nineteen bitches had their ovaries evaluated by ultrasonography between Days –10 and 16. Fisher's exact test was used to evaluate success rate and recovery rate between bitches with and without cystic structures in the ovaries exceeding normal follicle size ( $> 1.5$  cm, defined as possible cyst) as detected by ultrasonography. Bitches evaluated as having such possible cysts were included in the group with cysts.

## 3. Results

### 3.1. Included dogs

The 28 bitches included in the study were of 24 different breeds (German Shepherd dog ( $n = 3$ ), long-haired Collie ( $n = 2$ ), English Springer Spaniel ( $n = 2$ ), and one each of the following breeds: Alaskan Malamute, Australian Cattle dog, Australian Shepherd Dog, Bearded Collie, Boston Terrier, Dachshund, Doberman Pinscher, Drever, Golden Retriever, Great Dane, Irish Terrier, Irish Wolfhound, Japanese Spitz, Neapolitan Mastiff, Perro de agua Espanol, Pug, Shiba Inu, Staffordshire Bull Terrier, Standard Poodle and Yorkshire Terrier) and one bitch of mixed breed. The age range was 1 to 14 years when treatment started (mean age

± SD: 5.5 ± 3.8 years) and the weight range was 3 to 64 kg (mean weight ±SD: 23.0 ± 16.0 kg).

The diagnosis was based on the history, clinical examination, and laboratory findings. Abnormal vaginal discharge in combination with a fluid-filled uterus identified by ultrasonography and/or radiography was present in all, except in one case. In this case, the diagnosis was based merely on clinical signs and physical examination findings, and the first ultrasonographic examination performed 10 days after treatment had been started.

Not all treatments were completed at UDS, and when necessary, data regarding aglepristone injections, laboratory analyses, ultrasonography, radiography, antimicrobial treatments, and bacterial culturing were obtained from other veterinary clinics. Similarly, information about any surgical treatment, previous uterine disease, and recurrence of pyometra after treatment were as far as possible also obtained from other veterinary clinics and verified through journal copies.

### 3.2. Treatment protocols

The bitches had been treated with aglepristone (Alizin vet, Virbac, Stockholm, Sweden) (30 mg/mL) at a dose of 10 mg/kg sc in combination with administration of antimicrobials during the entire treatment period in all animals, except in two. In these two bitches, the antimicrobials were discontinued earlier than the aglepristone treatment). Aglepristone was administered on Days 1 and 2 and thereafter on Days 7 to 8, Days 14 to 15, and every 7th to 8th day until the end of treatment. Antimicrobial drugs administered to bitches in the study were enrofloxacin, amoxicillin, amoxicillin/clavulanic acid, ampicillin, marbofloxacin, trimetoprim/sulfadiazine, and metronidazol at doses according to Swedish guidelines (Fass vet, Läke-medelsindustriföreningens Service, Sweden). The duration of clinical signs before the start of treatment varied between 1 and 49 days. In 21/28 bitches, that is, 75%, treatment had started within 7 days after clinical signs were first observed (mean duration ± SD: 7.8 ± 10.4 days). In one bitch, no information on duration of clinical signs before diagnosis was available. Each bitch received between two and five aglepristone injections, with a median of four injections (in 12/26 bitches). Of the five bitches that had two injections, three were admitted to surgery (ovariohysterectomy) ≤7 days after the treatment was initiated and received no injections after that. Data on the total number of injections administered were missing in two bitches. These two bitches continued the treatment at another veterinary clinic according to the owner, and it was not possible to retrieve these data from these clinics.

### 3.3. Clinical signs

All 28 bitches had visible vaginal discharge before treatment with aglepristone started, that is, open cervix pyometra. One bitch showed clinical signs of pyometra 7 weeks after whelping. Of the bitches, six had been mated before they developed clinical signs of the disease. Additional case history and clinical findings are presented in Table 1.

**Table 1**

Case history data and clinical examination findings of the 28 bitches with pyometra included in the study.

History data/examination finding	In number of bitches/total number with data available	Percentage (%)
General condition		
Good	18/28	64
Moderately depressed	10/28	36
Severely depressed	0/28	0
Inappetence	13/26	50
Polyuria	7/18	39
Polydipsia	8/25	32
Vomiting	6/22	27
Diarrhea	3/22	14
Body temperature ≥39 °C	10/24	42
Dehydration	7/14	50
Abdominal pain	10/21	48
Mildly hyperemic mucus membranes	2/25	8
WBC over reference range	7/19	37
Increased or decreased neutrophil numbers	11/19	58

WBC, total white blood cell count.

### 3.4. Bacterial culture results and antimicrobial drugs

The bacteria isolated in 11 sampled bitches were *E. coli* (n = 6), *Staphylococcus intermedius* (n = 2), β-hemolytic *Streptococcus* (n = 2), *Pseudomonas aeruginosa* (n = 1), and *E. fergusonii* (n = 1). In one bitch, the vaginal culture was negative. Two different bacteria were isolated in two bitches (*E. coli* plus *E. fergusonii* and β-hemolytic *Streptococcus* sp. plus *Pseudomonas aeruginosa*). In the bitch with no bacterial growth, treatment with antimicrobials was done one day before the sample was taken. The two bitches that had cultures from urinary samples were the bitch with negative culture and the other with *Staphylococcus intermedius*.

The antimicrobial drugs that were used are listed in Table 2. The duration of antimicrobial treatment after aglepristone treatment started was up to 53 days with a mean duration ±SD of 23 ± 11.4 days. Eleven of the bitches had received antimicrobial drugs 1 to 30 days before aglepristone treatment started. The most frequently used antimicrobial drug was enrofloxacin in 23 of the 28 bitches.

### 3.5. Successful treatment

In 75% (21/28) of the bitches, treatment was successful, defined as return to a clinically healthy status. Of the seven bitches that did not have a successful treatment, six were ovariohysterectomized and one was euthanized. The success rate did not differ significantly between young (≤5 years) and older (>5 years) bitches (82% vs. 64%, P = 0.4). Presence of ovarian cystic structures larger than follicles did not significantly affect the success rate; 67% for those with cystic structures and 100% for those without cystic structures, (P = 0.09).

### 3.6. Recurrence

Recurrence was observed in 48% (10/21) of the successfully treated bitches, that is, recurrence only possible

**Table 2**  
Treatments and outcome for 28 bitches diagnosed with pyometra.

ID	Age (y)	Days with clinical signs before treatment	Number of treatments with aglepristone (on day)	Antimicrobial drugs	Duration of antimicrobial treatment (days)	Successful treatment	Recurrence	Time before recurrence (mo)	Follow-up time	At the end of the follow-up time
1	2,7	1	2 (Days 1, 2)	E	7	No	—		6 d	OHE
2	1	13	5 (Days 1, 2, 8, 15, 27)	Amox, T	40	Yes	Yes	First 3.5, second 17	2 y	Intact
3	1,2	1	4 (Days 1, 2, 7, 14)	Amp, E	21	Yes	No		1 y, 6.5 m	Intact
4	7,3	2	2 (Days 1, 2)	E	13	No	—		12 d	OHE
5	6,6	3	4 (Days 1, 2, 10, 17)	Amox	8	Yes	Yes	First 11, second 18	1 y, 7 m	OHE
6	13,8	2	4 (Days 1, 2, 8, 16)	E	22	Yes	Yes	16	1 y, 4 m	Dead <sup>e</sup>
7	14,1	24	4 (Days 1, 2, 9, 16)	T	20	No	—		23 d	Dead <sup>f</sup>
8	6,2	49	3 (Days 1, 2, 9)	E, Amox	22	Yes	No		3 y, 8 m	Intact
9	1,6	21	4 (Days 1, 2, MD, 16)	E	22	Yes	No		6 y	Intact
10	10,4	<7	4 (Days 1, 2, 9, 16)	Amp, E	18–21	Yes	Yes	9,5	9.5 m	Dead <sup>g</sup>
11	6,8	1	4 (Days 1, 2, 9, 18)	Amox	10 <sup>b</sup>	No	—		1 m	OHE
12	3,4	1	3 (Days 1, 2, 8)	E	20	Yes	Yes	21	1 y, 10 m	OHE
13	1,4	1	5 (Days 1, 2, 9, 16, 23)	E	30	Yes	No		6 y	Intact
14	4,8	<7	3 (Days 1, 2, 9)	E	23	Yes	Yes	First MD, second 72	6 y	Dead <sup>h</sup>
15	4,7	2	4 (Days 1, 2, 8, 15)	E	21	Yes	No		2 m	Dead <sup>i</sup>
16	3,1	1	2 (Days 1, 2)	E	8	No	—		1 w	OHE
17	4,9	None <sup>a</sup>	MD (Days 1, 2, MD)	E, M	15 <sup>c</sup>	Yes	Yes	17,5	1 y, 6 m	OHE
18	3,3	2,5	3 (Days 1, 2, 12)	E, Amox	33	Yes	No		3 y, 3 m to 4 y, 3 m	Dead <sup>i</sup>
19	4,4	14 <sup>a</sup>	3 (Days 1, 2, 8)	E	22	Yes	No		3 y, 1 m to 5 y, 1 m	Dead <sup>i</sup>
20	3,8	1	2 (Days 1, 2)	Amox	4	No	—		4 d	OHE
21	1,2	<7	4 (Days 1, 2, 9, 20)	E	36	Yes	No		4 y, 6.5 m	Intact
22	2,8	10	5 (Days 1, 2, 8, 15, 28)	E	33	Yes	No		2 y, 7.5 m	Intact
23	2,3	<7	4 (Days 1, 2, 8, 15)	E	29	Yes	No		4 y, 7.5 m	Intact
24	9,4	7	4 (Days 1, 2, 10, 23)	E	36	Yes	Yes	4	5 m	Dead <sup>j</sup>
25	11,4	7	MD (Days 1, 2, MD)	E	11 <sup>c</sup>	Yes	Yes	9	11 m	Dead <sup>k</sup>
26	10,3	7	4 (Days 1, 2, 8, 15)	E	21	Yes	Yes	3	4 m	OHE
27	5	1	2 (Day 1.2)	E, T	33 <sup>d</sup>	Yes	No		1 y	OHE
28	6,2	18	3 (Days 1, 2, 8)	Amox, E	53	No	—		<2 m	OHE

Abbreviations: Amox = Amoxicillin; Amp, Ampicillin; E, Enrofloxacin; M, Marbofloxacin; MD, missing data; OHE, ovariectomy; T, trimetoprim/sulfadiazine.

<sup>a</sup> Not so many clinical signs had ultrasonography performed for pregnancy control and a fluid-filled uterus was demonstrated.

<sup>b</sup> Treatment with antimicrobial drugs started 18 d after aglepristone treatment because of mastitis. During the month before the pyometra the bitch had been treated with antimicrobial drugs for about 3 wk.

<sup>c</sup> MD on exact time of treatment.

<sup>d</sup> Was first treated with antimicrobial drugs for 21 d, then had a bacterial culture and after 13 days started treatment with the other antimicrobial drug mentioned for 12 d.

<sup>e</sup> Did not respond to treatment, also had other diseases, and was euthanized.

<sup>f</sup> Did not respond to treatment and was euthanized.

<sup>g</sup> Recurrence with severely affected general condition, was not a good candidate for surgery, and was euthanized.

<sup>h</sup> Euthanized because of having a second recurrence.

<sup>i</sup> Euthanized because of other diseases.

<sup>j</sup> MD about the reason.

<sup>k</sup> Recurrence that did not respond to treatment with Cabergoline and was euthanized.

in the 10 successfully treated bitches. The recurrence rate was significantly higher in older (>5 years) than younger ( $\leq 5$  years) bitches (86% vs. 29%,  $P = 0.02$ ). The first recurrence after treatment occurred from 3 to 21 months (mean 10.5 months SD 6.5) after the end of treatment. In one bitch, information about the exact time of recurrence was not available. Seven bitches were either ovariectomized or euthanized within 2 months because of the recurrence or other reasons. The remaining three bitches had a second recurrence 17 to 72 months after the first treatment had ended. Presence of ovarian cystic structures did not affect the recurrence rate (50% with cystic structures and 50% without cystic structures,  $P = 1$ ).

### 3.7. Outcome

The follow-up time was between 4 days and 6 years. At the end of the study, eight of the 28 bitches remained intact, 11 bitches had been ovariectomized, and nine had died. For the bitches that were still intact at the end of the study, the follow-up time varied from 1.5 years to 6 years (mean  $\pm$  SD follow-up time for the intact bitches was  $46.5 \pm 21$  months). More details about the outcome are given in Table 2.

### 3.8. Puppies and mating

Before the pyometra diagnosis, 21% (6/28) of the bitches had produced at least one litter. Two of the bitches had

produced two litters. Eight bitches had been mated without getting pregnant at some point before the pyometra and six of these had been mated 14 to 45 days before pyometra developed. After treatment, 69% (9/13) of the mated bitches whelped and produced puppies. Of the nine bitches that whelped, four produced one litter, four produced two litters, and one produced four litters.

### 3.9. Adverse effects

Adverse effects after aglepristone administration were observed in five bitches. The adverse effects were anxiety (three bitches) and loss of appetite (two bitches). The three anxious bitches also showed one or more of the following adverse effects: panting ( $n = 2$ ), diarrhea ( $n = 2$ ), abdominal cramps ( $n = 1$ ), or polydipsia ( $n = 1$ ). Data were missing in two cases. Owners of 23 bitches could not recall any adverse effects from the treatment, but in two of these bitches, adverse effects had been recorded in the journals, and were thus included in the results.

## 4. Discussion

The overall success rate of medical treatment with aglepristone for pyometra was 75% (21/28 bitches), defined as return to a clinically healthy status. This proportion is somewhat lower than that reported in three other studies of medical treatment with aglepristone where the success rates were 100% (24/24), 83% (34/41), and 92% (48/52), respectively [13,16,18]. Our success rate, however, was higher than that in one report, 60% (12/20) [19]. These differences between studies may be explained by different selection of candidates for medical treatment because of different traditions and routines in different countries. Additionally, the individual patients included influence the results, that is, minor studies may not represent the situation at large because of few included bitches. In our study, some bitches had shown clinical signs weeks before the treatment was initiated, which may have negatively influenced the outcome rather than if treatment had been started earlier in the development of the disease. Early treatment could be expected to give better treatment results because the uterus has been exposed to infection for a shorter time. Generalized inflammation or sepsis would then less be likely to affect the bitch systemically and with complications less prone to occur.

All treated bitches in this study had open cervix pyometra. Open cervix as opposed to closed cervix was not reported to affect the treatment results in two studies including both opened and closed cervix pyometra patients [13,17]. However, another study [16] found a higher success rate in bitches with open (85%) compared with closed (75%) pyometra.

The recurrence rate in this study was 48%, with a follow-up time of up to 6 years. In one long-term study, the recurrence rate was reported to be 27% within 1 year after treatment [18]. In another study, the recurrence rate was 30% in bitches older than 5 years as evaluated by the following estrus, and there was no recurrence in bitches that were 5 years or younger at the start of treatment [13]. The relatively higher recurrence rate in the present study

could be due to the longer follow-up time (up to 6 years when compared with 1 year or the next estrus) [13,18]. The mean time until recurrence in this study was 10.5 months and therefore it can be assumed that more bitches would have had a recurrence recorded if they had been followed up for a longer period of time also in the other studies. The recurrence rate in this study estimates the actual long-term recurrence rate, which is advantageous compared with studies evaluating shorter time-periods after treatment. Because the long-term recurrence rate of medical treatment for pyometra was significantly higher in older bitches, owners should be informed that the risk of recurrence can be as high as 86% in bitches older than 5 years.

In three bitches, a second recurrence was observed within 17 to 72 months after the first pyometra treatment. Although only three bitches with repeated recurrence were studied, the prognosis for medical treatment of recurring pyometra was therefore deemed poor because the disease recurred again in all of these bitches. All the other seven bitches that had a recurrence were either ovariohysterectomized or euthanized within 2 months because of the recurrence or for other reasons.

Six of the bitches in this study had been mated before developing pyometra. This could be because many of the bitches selected for medical treatment were destined for breeding. It is unlikely that mating itself had induced pyometra in these bitches because experimental attempts to induce the disease by inserting bacteria in a healthy uterus during estrus have failed [20]. In this study, 69% (9/13) of the bitches became pregnant and whelped after treatment. By contrast, in an earlier study, 57% (8/14) of bitches less than 5 years old whelped and 0% (0/9) bitches over 5 years of age [13]. Our results can also be compared with other studies in which bitches treated with prostaglandin conceived in 5 out of 9 (56%) [21], 9 out of 11 (82%) [22], 9 out of 14 (64%) [11], and 5 out of 5 (100%) [23] of the treated cases. In one study of bitches treated with cabergoline in combination with cloprostenol, 7 out of 11 mated bitches (64%) produced puppies [24]. Compared with results in other studies, the fertility after mating was more favorable in the present study. Only two bitches in this study that were 5 years old or older when treatment started subsequently were mated; therefore, fertility after treatment was not compared between bitches older or younger than 5 years.

The mean duration of antimicrobial treatment was 23 days, which is longer than in some other studies (only up to 7 days) [13,19]. The duration of antimicrobial treatment was not defined in some studies, which makes it difficult to compare different results in relation to antimicrobial treatment [16,18]. This raises the matter of whether the antimicrobial therapy is aimed at treating the uterine infection or to prevent progression of the infection to sepsis and the duration of antimicrobial therapy necessary in both situations. Possibly the progesterone antagonist is most useful in curing the disease, and antimicrobial therapy may be limited to fewer days than what is currently recommended. Possibly the progesterone antagonist is most useful in curing the disease, and antimicrobial therapy could be limited to fewer days than what is currently recommended. Further studies of this aspect are needed,

especially considering the treatment of promoting antimicrobial resistant bacteria. The optimal duration of antimicrobial therapy should be studied more considering that one of the bitches in the present study was treated for as long as 53 days with antimicrobials.

Because this study was retrospective, it has some limitations. For example, information may have been forgotten by the owners, ultrasound examinations were not performed at the same day on all bitches, and blood samples were not obtained from all bitches. One factor that makes it more difficult to compare different studies of medical treatment of pyometra are the different definitions of success used and how a favorable outcome is defined—whether it is return to a clinically healthy status or the ability to produce puppies or the absence of recurrence. In the present study, the definition of successful treatment was a healthy status after treatment because this is sometimes the only goal when selecting medical treatment and it is a necessity for breeding the bitch again. As a consequence of being a long-term study, the number of variables investigated produced a lot of data in fewer and fewer bitches as the study period progressed, and a larger material would have been desirable. However, the main strength was that all included bitches were studied in detail and for a substantial follow-up time.

In conclusion, if the owner wants to breed the bitch or to avoid surgery or anesthetics in high-risk patients, treatment with aglepristone can be a good option because it was successful in 75% of the treated bitches. However, the possibly increased risk of offspring developing pyometra should be considered because large breed variations in the incidence of pyometra have been shown, which indicates that there may be genetic factors predisposing for the disease [1]. The owners should also be informed that the risk of recurrence is higher for a bitch that is 5 years or older than a younger bitch. Treatment with aglepristone after recurrence was not successful in the present study.

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