



Pyometra Treatment in Bitches with Different Protocols

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Abstract | The focus of the present study was to evaluate various methods of treatment of pyometra in bitches. For this purpose, the study was conducted in a private clinic and veterinary hospital in Baghdad. The study included seventeen different breeds bitches. The ages of bitches range from 12-132 months with an average of 38 months. Bitches are diagnosed with pyometra (open and closed) depending on clinical signs, ultrasound, and complete blood count (CBC). Bitches were allocated into four groups: Group I: five bitches received only Aglepristone (Alizin[®]) given at 10 mg/kg Sc. Group II: four bitches received Aglepristone (Alizin[®]) was given at 10 mg/kg Sc and PGF_{2α} at 1 mcg/kg B.W. after vaginal discharge appeared and continue until discharge disappeared. Aglepristone was repeated after 24 hours and seven days if needed for groups I and II. Group III: six bitches with open pyometra received Misoprostol (Cytotec[®]) given intravaginally as 200 mcg/bitch. All groups received a course of antibiotics. Group IV: two bitches treated by ovariohysterectomy under general anesthesia. Bacterial isolation was made on chromogenic agar to identification of bacteria associated with pyometra. In group I after 24 hr. from giving Aglepristone there was vaginal discharge, in some cases, we need to give a second dose of Aglepristone to bitch. In group II, PGF_{2α} was injected after pus came out from the vulva, there was a rapid evacuation of pus from the uterus in comparison with group I with many side effects such as tachycardia, panting, and hypersalivation. In group III Misoprostol was used intravaginal, and evacuation of pus was seen after 1 hr. from administration, the evacuation was more than in groups I and II without side effects such as tachycardia and increased panting that occurred in group II. In group IV recovery occurred after surgery. E -Coli and Enterococcus were the most dominant bacteria in bitches with pyometra. We concluded that combined Aglepristone with PGF_{2α} effectively treated pyometra in bitches. Misoprostol also increased uterine contractions with quick evacuation of uterine content.

Keywords | Bitches, Pyometra, Aglepristone, Misoprostol, PGF_{2α}, Different protocols

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INTRODUCTION

Pyometra is considered one of the most diseases that threaten the life of bitches, which reveals as life-threatening (Bagri *et al.*, 2022). Many factors like bacterial and hormonal, are essential for the pathogenesis of

pyometra (Hagman, 2017; Liao *et al.*, 2020). An increase in estrogen level during the estrous phase plays a role in enhancing the endometrial response to progesterone, while in diestrus, an increase in progesterone concentration causes an elevation in endometrium proliferation, endometrial glands secretion and a decrease in the contraction of

myometrium and cervix (Kumar and Saxena, 2018; Limmanont *et al.*, 2021). Several complications related to the pyometra were pointed out. For example, peritonitis, cervical stump abscess, hemorrhage, sepsis, swelling of wound, fistulous tract development, uveitis, conjunctivitis, pyelonephritis, urinary tract infection, myocarditis arrhythmia, (Jitpean *et al.*, 2017; Hagman, 2022). Many medical treatments have been used for treating pyometra in small animals with different protocols. Aglepristone is a progesterone antagonist, binds to progesterone receptors without stimulating any of the hormone's effects and causes relaxation of the cervix over 48 hours (Contri *et al.*, 2015; Gogny and Fieni, 2016). Many researchers reported using prostaglandin-F2 alpha (PGF₂a) due to the luteolytic and uterotonic effects to treat pyometra (Molina 2015; Rosa Filho *et al.*, 2020). Misoprostol (a synthetic analogue of PGE1) can be given orally at a dose of 10 mcg/kg BID or intravaginally, which can increase uterine contraction that helps to evacuate the uterine contents during treatment of pyometra (Agaoglu *et al.*, 2011, 2014). Fransson (2018) regarded ovariohysterectomy as an appropriate method for treating pyometra. This research assesses different medication methods for pyometra in bitches in Iraq.

MATERIALS AND METHODS

The work was conducted in a private clinic and veterinary hospital in Baghdad. The study involved seventeen bitches of various breeds (German Shephard, Terrier, Husky, Belgian Malinois and Doberman). The ages of bitches range from 12-132 months with an average of 38 months. Bitches diagnosed with pyometra (open and closed) depending on clinical signs, ultrasound examination by Sonosite 180 device (USA) with convex probe, and complete blood count (CBC) HumaCount 30TS (Germany). Bitches were allocated into four groups:

Group I: five bitches received only Aglepristone (Alizin®) given at 10 mg/kg Sc.

Group II: four bitches received Aglepristone (Alizin®) was given at 10 mg/kg Sc and PGF₂α at 1 mcg/kg B.W. after vaginal discharge appeared and continued until discharge disappeared.

- Aglepristone was repeated after 24 hours and seven days if needed for groups I and II.

Group III: six bitches with open pyometra received Misoprostol (Cytotec®) given intravaginally as 200 mcg/bitch

- All groups received a course of antibiotics.

Group IV: two bitches treated by ovariohysterectomy under general anesthesia.

- After ovariohysterectomy, samples from the uterus were taken for histopathological sections by routine processing described by Bancroft and Gamble (2008).

Sixteen samples from pus were taken to detect the most common bacteria associated with pyometra in bitches by using chromogenic agar according to methods described by (Samra *et al.*, 1998).

STATISTICAL ANALYSIS

To disclose the difference between normal and pyometra groups statistically, we used a one-way analysis of variance (ANOVA) on probability P-value below 0.05.

RESULTS AND DISCUSSION

Bitches with pyometra showed clinical signs such as fever, loss of appetite, lethargy, and vaginal discharge in the case of open pyometra. In an ultrasound examination, there was an accumulation of pus in the uterus with increased uterine wall thickness. Table 1 shows the haematological values for healthy bitches and bitches with pyometra. Statistically significant differences (P<0.05) were observed for all bitches with pyometra compared to healthy ones for WBC, monocyte, RBC and hemoglobin (Table 1).

Table 1: Complete blood count (mean±SD) in normal bitches and bitches with Prometra.

CBC	Normal	Pyometra	Unit
WBC	9.69±3.91	17.61±5.64*	10 ⁹ /l
LYM	4.26±3.24	8.45±6.32	10 ⁹ /l
MON	1.28±0.89	2.74±1.95*	10 ⁹ /l
GRA	4.15±2.95	6.42±3.45	10 ⁹ /l
LYM%	41.96±23.51	42.08±18.96	%
MON%	12.54±4.48	13.95±7.26	%
GRA%	45.50±25.88	43.95±25.87	%
RBC	5.92±1.09	4.29±0.88*	10 ¹² /l
HGB	14.87±2.63	10.60±2.59*	g/dl
HCT	40.98±7.34	30.31±6.52*	%
MCV	69.70±6.79	70.75±2.31	fI
MCH	25.32±2.65	24.60±2.18	Pg
MCHC	36.37±2.51	34.78±1.99	g/dl
RDWs	30.72±5.92	34.20±2.52	fI
RDWc	15.44±1.98	16.60±1.35	%
PLT	321.20±63.60	364.50±88.22	10 ⁹ /l
PCT	0.46±0.10	0.52±0.16	%
MPV	14.15±1.45	14.00±1.03	fI
PDWs	21.18±4.29	21.10±5.53	fI
PDWc	41.50±2.24	41.48±2.35	%
P-LCC	130.17±43.36	154.50±58.86	10 ⁹ /l
P-LCR	42.04±6.34	41.11±5.51	%

* Significant differences (P value < 0.05) between normal and pyometra groups.

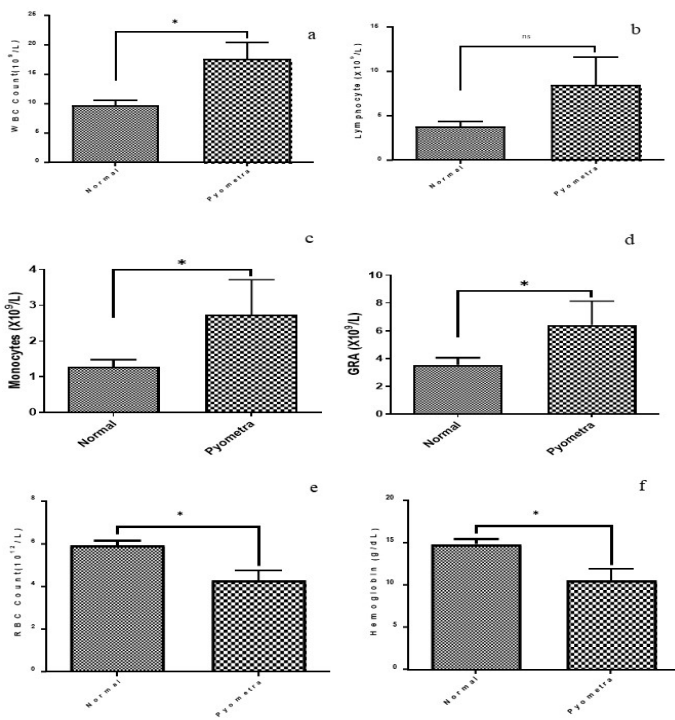


Figure 1: Hematological parameters of normal bitches and bitches with pyometra.



Figure 2: Uterus of bitch with pyometra.

In group I after 24 h from giving Aglepristone there was vaginal discharge, in some cases, we need to give a second dose of Aglepristone to bitch. In group II, PGF₂ α was injected after pus came out from the vulva, there was a rapid evacuation of pus from the uterus compared with group I with many side effects such as tachycardia, panting, and hypersalivation. In group III Misoprostol was used intravaginal, and evacuation of pus was seen after 1 h. from administration, the evacuation was more than in groups I and II without side effects such as tachycardia and increased panting in group II. In group IV recovery occurred after surgery (Figure 2). The examination section of the bitch uterus infected with pyometra showed extensive thickening of the endometrium due to cystic endometrial hyperplasia (CEH) appeared as a papillary growth complex with pyometra, also extensive inflammatory reaction seen in the endometrial stroma (Figure 3A). Other sections showed

sloughing of epithelial cells surrounded by inflammatory cells and the epithelial cells appeared large foamy cytoplasm (Figure 3B). According to the isolation and detection of bacteria, our results showed that the numbers and percentages of *E. coli*, Enterococcus, Pseudomonas and Klebsiella distributed as {5 (31) %, 5 (31) %, 3 (19)% and 3 (19) %}, respectively (Figure 4).

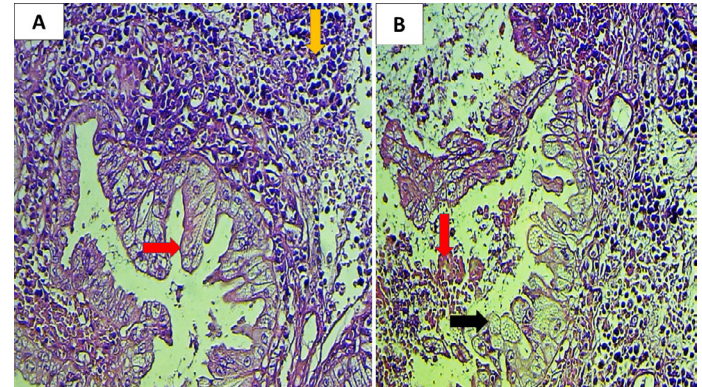


Figure 3: Histopathological section of bitch uterus (A) showing cystic endometrial hyperplasia (CEH) appeared as papillary growth complex with pyometra (red arrow), also extensive inflammatory reaction seen in the endometrial stroma (yellow arrow) (B) showing sloughing of epithelial cells (red arrow), the epithelial cells appear large foamy cytoplasm (black arrow) (H & E, 400X).

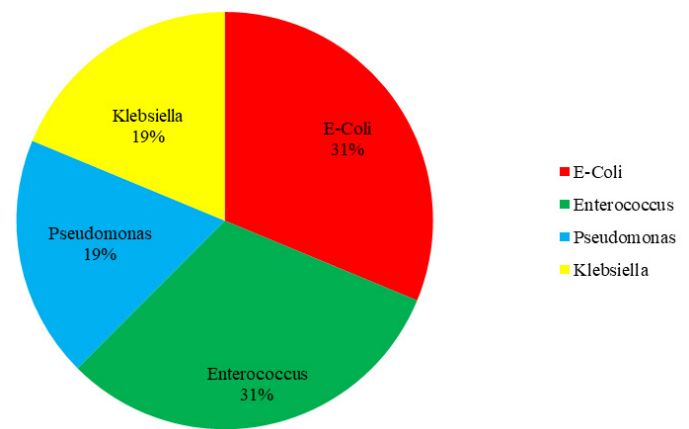


Figure 4: Distribution of isolated bacteria associated with pyometra in 16 bitches.

In this study, the average age of bitches with pyometra was 38 months, this age was younger than that reported by (Melandri et al., 2019; Lansubsakul et al., 2022; Zheng et al., 2022) in which they found that the average age was (8.5, 5.1, 9.3) years, respectively, this result may be due to bad management during mating by the owners and use different hormones without veterinarian consultation. Clinical signs such as fever, lethargy, loss of appetite, polyuria, and polydipsia are similar to those conveyed (Sethi et al., 2020; Sharma, 2022; Dadona et al., 2023). Bitches with pyometra suffered from leukocytosis, which results due to an inflammatory response to pyometra (Jitpean et

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al., 2014), while anemia is also reported and this result in an agreement with (Jitpean *et al.*, 2017; Rungphattanachaikul *et al.*, 2021). According to group I and group II, Aglepristone acts as a block to progesterone receptors, leading to cervical opening and evacuating uterine contents (Hoffmann and Schuler, 2000; Fieni, 2006). Also, Aglepristone permits follicular maturation by binding to progesterone's receptors in the hypothalamus, which removes negative feedback on gonadotropin-releasing hormones (Fieni *et al.*, 2001). Our results agree with other research dealing with the effectiveness of aglepristone in the treatment of pyometra (Contri *et al.*, 2015; Melandri *et al.*, 2019; Attard *et al.*, 2022; Dadona *et al.*, 2023). In group II, PGF_{2α} was given subcutaneously after appearing of vaginal discharge led to an acceleration in evacuating of the uterus from the pus due to its uterotonic, luteolytic, and stimulation of the muscle musculature (Hagman, 2023). Further, our findings are in harmony with many papers associated with the efficacy of PGF_{2α} in treating pyometra in dogs (Jena *et al.*, 2013; Shah *et al.*, 2016; Hagman, 2018; da Rosa Filho *et al.*, 2021). In group III, Misoprostol given intravaginally is a synthetic analogue of natural prostaglandin E1 (Garris and Kirkwood, 1989), the pharmacological action of misoprostol on uterine contractions by increased frequency and amplitude, also causes expulsion of uterine contents and cervical dilatation (Plumb, 2018; Oliveira *et al.*, 2023). Misoprostol is used to treat pyometra without side effects when using PGF_{2α}, especially when given intravaginal which results in agreement with (Romagnoli, 2017; Sharma, 2022). In group IV, after ovariohysterectomy, the bitches recovered after one day and returned to normal health. Many researchers considered ovariohysterectomy as the best choice for the treatment of pyometra in dogs and cats with only the risk of surgical operation and its cost (Misk and El-Sherry, 2020; Liao *et al.*, 2020; Lansubakul *et al.*, 2022). Our results for bacterial isolation showed that E-Coli that was the most dominant bacteria which is incoordinate with other studies (Liao *et al.*, 2020; Lansubakul *et al.*, 2022).

CONCLUSIONS AND RECOMMENDATIONS

We concluded that combined Aglepristone with PGF_{2α} effectively treated pyometra in bitches. Misoprostol also increased uterine contractions with quick evacuation of uterine content. We recommended for treatment pyometra to use a combination of Aglepristone and misoprostol in bitches.

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The novelty of this study is that using a combination Aglepristone with PGF_{2α} and misoprostol for the treatment of pyometra in bitches.

AUTHORS CONTRIBUTION

All authors equally contributed.

CONFLICT OF INTEREST

The authors have declared no conflict of interest.

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