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## Haemato-biochemical profile among clinical cases of canine pyometra

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### Abstract

Canine pyometra is recognized as one of the main causes of reproductive disease, which leads to endotoxemia and eventually death in bitches. The clinical signs in combination with haemato-biochemical parameters and ultrasonographic examination are useful in diagnosing pyometra. In the present study, 44.44 per cent of the animals each between the age group of 4-6 years falling under nulliparous category showed a high incidence of pyometra. The affected animals showed a total leucocyte count of  $41.9 \pm 4.61 \times 10^3/\mu\text{L}$ , haemoglobin count of  $12.62 \pm 0.86\text{g/dL}$ , neutrophil count (in per cent) of  $84.84 \pm 2.38$ , blood urea nitrogen and serum creatinine values of  $34.49 \pm 7.11\text{ mg/dL}$  and  $1.97 \pm 0.43\text{mg/dL}$ , respectively. A hundred per cent efficiency of treatment with minimal side effects was observed by treating open cervix clinically stable pyometric bitches with Dinoprost tromethamine at a dose lower than the therapeutic dose.

**Keywords:** Open cervix pyometra, dinoprost tromethamine, nulliparous, endotoxemia

### Introduction

Canine pyometra finds itself a place amongst the most common reproductive diseases observed in canines. It is usually observed in intact adult bitches <sup>[1, 2]</sup>. Certain breeds show increased or decreased susceptibility to pyometra, which can be attributed to genetic factors in the development of the disease <sup>[3, 4]</sup>. Repeated oestrogen stimulation sensitizes the uterus to the effects of progesterone, rendering it susceptible to bacterial infection <sup>[5]</sup> which leads to cystic endometrial changes, termed cystic endometrial hyperplasia (CEH). In canines with CEH, depending on blood, mucus, watery secretions, purulent discharge/pus accumulated in the uterus different gynaeco-pathological conditions are termed as hematometra, mucometra, hydrometra and pyometra, respectively. The degree of cervical patency combined with an intrauterine accumulation of purulent and/or haemorrhagic secretions determines the extent of inflammation of the endometrium which eventually causes failure of the uterus to contract and cervix to relax leading to loss of general condition, thereby decreasing the effect of bacterial clearance <sup>[6]</sup>. This failure in bacterial clearance, before the onset of the luteal phase, results in the development of pyometra <sup>[7]</sup>. Ovario-hysterectomy being the safest and radical form of treatment for pyometra, renders the animal unfit for further productivity. In open cervix pyometric bitches, treatment with natural prostaglandin (Dinoprost tromethamine) at the dose rate of  $0.025\text{mg/kg}$  over a period of five days was found to be effective <sup>[8]</sup>. The study aimed was to review the treatment in combination with antibiotics and supportive therapy.

### Materials and methods

The female dogs presented to the Teaching Veterinary Clinical Complex (TVCC), Pookode, between March 2020 and July 2021, were prospectively evaluated when suspected of pyometra and confirmed by the presence of convoluted, tubular horns containing anechoic or hypoechoic fluid with thickened endometrium carried out by B-mode trans-abdominal ultrasonography (USG) in combination with four or more of the following clinical signs: anorexia, discomfort on abdominal palpation, pyrexia (body temperature equal to or higher than  $103^\circ\text{F}$ ), polyuria, polydipsia, vomiting or vaginal discharge. Furthermore, the distended uterine diameter was also recorded. The haematological parameters like total leucocyte count (TLC,  $\times 10^3/\text{mm}^3$ ), haemoglobin (g/dL), differential leucocyte count (DLC, %) were analysed using automatic analyser, while blood urea nitrogen (BUN) (mg/dL) and creatinine (mg/dL) in the sera samples were analysed immediately using semi-automated biochemistry analyser. The treatment for open cervix pyometric bitches included an injection of Dinoprost tromethamine at the dose rate of  $0.025\text{ mg/kg}$  subcutaneously at 12-h interval daily for 5 days in combination

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with antibiotics and fluid therapy.

## Results and discussion

The number of dogs under study belonging to different age groups *i.e.*, below two years, between two and four years, four and six years and above six years were found to be 1(5.55%), 3(16.66%), 8(44.44%) and 6 (33.33%), respectively. Five animals each with pyometra (27.78%) belonged to the primiparous and pluriparous category, whereas 8 female dogs (44.44%) belonged to the nulliparous group. With the increasing age, hyperplastic changes in the endometrium, reduced functionality of endocrine glands and gonads and their interrelationship could be attributed to the development of pyometra. The affected dogs under study showed various clinical signs *viz.* anorexia and vaginal discharge (66.66%), dullness (55.55%), polydipsia (61.11%), dehydration and pyrexia (44.44%), polyuria (38.88%) and vomiting tendency (27.77%).

The total leucocyte count ( $\times 10^3/\mu\text{L}$ ; mean  $\pm$  SE) of pyometra-confirmed dogs recorded on the day of admission was found to be  $41.9 \pm 4.61 \times 10^3/\mu\text{L}$ . An aggressive bone marrow response due to increased stress on the immune system and diffused suppurative inflammation of the uterus to combat the infection could be attributed to elevated leucocyte count. Similar results were recorded by other authors<sup>[9, 10, 11, 13]</sup>. The haemoglobin (mean  $\pm$  SE) of the dogs under study was found to be within the normal range of  $12.62 \pm 0.86\text{g/dL}$ , as reported earlier<sup>[11]</sup>. Monocyte and eosinophils (in per cent) were  $2.97 \pm 0.15$  and  $2.81 \pm 0.28$  respectively which was within normal limits. Similar values among pyometra-affected dogs were reported<sup>[9, 11]</sup>. Neutrophils (in per cent) were  $84.84 \pm 2.38$  which indicated inflammation of the uterine wall and was in close accordance with the earlier studies<sup>[10, 11, 12]</sup>.

Serum biochemical parameters such as BUN and creatinine (mean  $\pm$  SE) of the pyometra-confirmed dogs recorded on the day of admission were observed to be  $34.49 \pm 7.11\text{ mg/dL}$  and  $1.97 \pm 0.43\text{mg/dL}$ , respectively. Possibly, dehydration leading to pre-renal azotaemia, endotoxemia and senility could be attributed to elevated BUN and creatinine values. Similar results were recorded in previous studies<sup>[9, 10, 11, 13]</sup>. The mean  $\pm$  SE of uterine horn diameter of these pyometra-affected dogs on day 0 was  $2.70\text{ cm} \pm 0.20$  which was due to accumulation of variable quantity of exudate in the uterine lumen as well as suppurative inflammatory changes of the uterine wall. According to the classification by<sup>[15]</sup>, the dog in the present study falls under the pyometra group (with uterine horn diameter  $>2.4\text{ cm}$ ), against endometritis (with uterine horn diameter up to  $2.4\text{ cm}$ ). These results were upheld by other scientific workers<sup>[10, 11]</sup>. Treatment with prostaglandins, which is recommended for bitches with metritis or pyometra with mild dilatation of the uterine lumen, produces a cure rate of 83-100% which proved our findings.

Out of the 18 animals selected for the study, 7 dogs showed closed cervix pyometra and 6 dogs with serious kidney dysfunction, liver dysfunction, pre-existing cardiac disease, as indicated by altered haematobiochemical parameters and serious damage to the endometrium as confirmed by USG were deprived the prostaglandin treatment to avoid the risk of serious side effects. Five animals that received the treatment (Dinoprost tromethamine @  $0.025\text{ mg/kg s/c}$ , 12-h interval for 5 days) showed complete pus evacuation from the uterus after five days which was confirmed by USG. In the present study, the success of the treatment was mainly due to use of natural prostaglandin which provided better spasmogenic and luteolytic action at a lower therapeutic dose.

The present study concluded that dogs between 4-6 years of age and dogs above six years of age belonging to the nulliparous group showed a higher incidence of pyometra and

their treatment in open cervix cases with lower doses of natural prostaglandin at 12h interval proved effective and safe with minimal to nil adverse side effects.

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