



ISSN: 2456-2912

VET 2024; 9(1): 783-786

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Received: 15-10-2023

Accepted: 18-11-2023

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## Physiological Haematological and biochemical parameters of bitches affected with closed and open cervix pyometra

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#### Abstract

The present research to evaluation of physiological, haematological and biochemical parameters of bitches affected closed and open pyometra. All pyometra affected bitches (n=18) were subjected to parameters of physiological, haematological and biochemical affected with closed and open pyometra. In closed and open cervix pyometra the parameters of physiological like respiration rate and rectal temperature were increased pyometra affected bitches and end of treatment groups decreased significantly whereas the parameter of heart rate didn't show changes in treatment groups. In closed and open pyometra, parameters of haematological like PCV, haemoglobin, TEC value and lymphocyte count value decreased in closed and open pyometra affected bitches and it was increased after treatment. In closed and open pyometra neutrophil count, total leucocyte count and monocyte count was increased in closed and open cervix pyometra affected bitches and after end of treatment significant was decreased. In closed and open pyometra, parameters of biochemical like serum creatinine, blood urea nitrogen (BUN), alkaline phosphatase (ALP) and aspartate transaminase were increased the affected bitches and after end of treatment it was decreased significantly. In closed and open pyometra, Alanine transaminase (ALT) level was decreased in closed and open pyometra affected bitches and after end of treatment it was increased significantly. However, mean corpuscular haemoglobin (MCH), mean corpuscular volume (MCV) and mean corpuscular haemoglobin concentration (MCHC), eosinophil count value was observed no significant change.

**Keywords:** Pyometra, bitch, hematology, leukocytosis, neutrophilia

#### Introduction

The most common reproductive diseases are pyometra it is accumulation of pus in uterus (Johnston *et al.*, 2001) [12]. The pyometra symptoms observed like anaemia, leucocytosis, monocytosis and neutrophilia with a left shift (Jitpean *et al.*, 2014) [11]. Asheim 1964 [1]; Borresen, Skrede 1980 [3] were observed biochemical symptoms like increased value of serum creatinine, blood urea nitrogen (BUN), hypoalbuminemia, proteinuria, hypercholesterolemia and alkaline phosphatase (ALP). The closed and open cervix pyometra diagnosis based on clinical symptoms like pyrexia, conjunctival mucous membranes, anorexia, vomition, dehydration and abdominal distention and marked with leukocytosis, monocytosis, neutrophilia with a left shift, low hemoglobin and elevated blood urea nitrogen (Kumar and Kumar 2016) [14]. The consistent clinical finding observed in closed and open cervix pyometra bitches affected like neutrophilia with left shift, lymphopenia, monocytosis with normal eosinophil count (Jena *et al.*, 2013) [10].

#### Materials and Methods

The research studied at Dept of Veterinary Gynaecology & Obstetrics, C.V.Sc, R nagar and Hyderabad. The observed 18 different breeds of bitches age group of 2 to 12 years that were brought to the Teaching Veterinary Clinical Complex (TVCC), Bhoiguda and Veterinary College Hospital, College of Veterinary Science, Rnagar, Hyd period of January 2017 to November 2017 with known history and clinical symptoms indicative canine pyometra. The closed and open cervix pyometra diagnosis was confirmed by hematology, radiography, abdominal palpation and ultrasonography.

The parameters of physiological like respiration rate, rectal temperature and heart rate and parameters of haematological like Hb, packed cell volume (PCV), Total erythrocyte count (TEC), Total leukocyte count (TLC), neutrophil count, lymphocyte count, eosinophil count, erythrocyte indices and parameters of biochemical like value of serum creatinine, blood urea nitrogen (BUN), alkaline phosphatase (ALP), aspartate transaminase (AST) and Alanine transaminase (ALT). The closed and open cervix pyometra affected bitches divided into three groups and six affected bitches in each group and different treatment protocols.

## Results

In the present study, revealed that 33.33 percent of bitches

TLC count was within normal range ( $<17000$  cells/mm<sup>3</sup>) and marked leukocytosis was 66.66 percent ( $>17000$  cells/mm<sup>3</sup>) and neutrophilic count was within normal range ( $<77$ ) in 25 percent of bitches and marked neutrophilia count was 75 percent ( $>77$ ) in open pyometra bitches. In closed pyometra affected bitches revealed that 33.33 percent of bitches TLC count was within normal range ( $<17000$  cells/mm<sup>3</sup>) and marked leukocytosis was 66.66 percent ( $>17000$  cells/mm<sup>3</sup>) and neutrophilic count within normal range ( $<77$ ) in 16.66 percent affected bitches and marked neutrophilia count was 83.33 percent ( $>77$ ). The above values of all parameters of physiological, haematological and biochemical are represented in Table-1, 2, 3

**Table 1:** Mean value of parameters of physiological affected bitches with closed and open pyometra on different treatment protocols

Treatment groups	Mean value of Physiological parameters (Mean $\pm$ SE)					
	Mean value of rectal temperature		Mean value of heart rate (per minute)		Mean value of Respiration rate	
	Pre-treatment	Post treatment	Pre-treatment	Post treatment	Pre-treatment	Post treatment
Group I (n=6)	103.25 $\pm$ 0.13	102.75 $\pm$ 0.09 <sup>a</sup>	118.16 $\pm$ 1.64	108.83 $\pm$ 1.53 <sup>a</sup>	32.33 $\pm$ 0.84	27.00 $\pm$ 1.06 <sup>a</sup>
Group II (n=6)	103.05 $\pm$ 0.14	102.73 $\pm$ 0.11 <sup>a</sup>	111.66 $\pm$ 1.42	109.50 $\pm$ 1.60 <sup>a</sup>	31.33 $\pm$ 0.76	28.83 $\pm$ 1.10 <sup>b</sup>
Group III(n=6)	103.45 $\pm$ 0.27	102.85 $\pm$ 0.20 <sup>b</sup>	114.83 $\pm$ 1.77	111.16 $\pm$ 2.10 <sup>a</sup>	31.00 $\pm$ 0.57	28.66 $\pm$ 0.66 <sup>b</sup>

**Table 2:** Different groups of biochemical parameters bitches with closed and open pyometra pre and post treatment

Biochemical Parameters	Mean value of pre-treatment (Mean $\pm$ SE)			Mean value of post treatment (Mean $\pm$ SE)		
	Group I	Group II	Group III	Group I	Group II	Group III
BUN	23.09 $\pm$ 0.73	29.01 $\pm$ 0.64	23.60 $\pm$ 1.18	17.23 $\pm$ 0.78 <sup>a</sup>	20.87 $\pm$ 0.57 <sup>b</sup>	17.44 $\pm$ 0.60 <sup>a</sup>
Serum Creatinine	2.09 $\pm$ 0.07	2.26 $\pm$ 0.12	2.08 $\pm$ 0.04	1.83 $\pm$ 0.01 <sup>a</sup>	1.88 $\pm$ 0.01 <sup>b</sup>	1.87 $\pm$ 0.01 <sup>b</sup>
AST	48.50 $\pm$ 0.73	48.91 $\pm$ 0.76	49.24 $\pm$ 0.55	37.25 $\pm$ 0.86 <sup>a</sup>	44.14 $\pm$ 0.51 <sup>b</sup>	38.78 $\pm$ 0.41 <sup>a</sup>
ALT	29.35 $\pm$ 0.58	26.81 $\pm$ 0.76	29.09 $\pm$ 0.72	36.63 $\pm$ 0.63 <sup>ab</sup>	34.30 $\pm$ 1.07 <sup>a</sup>	37.02 $\pm$ 0.70 <sup>b</sup>
ALP	155.46 $\pm$ 0.93	157.26 $\pm$ 1.27	156.55 $\pm$ 0.80	120.78 $\pm$ 0.37 <sup>a</sup>	137.63 $\pm$ 1.28 <sup>b</sup>	122.65 $\pm$ 0.85 <sup>a</sup>

**Table 3:** Different groups of haematological parameters bitches with closed and open cervix pyometra pre and post treatment

Haematological Parameters	Pre-Treatment (Mean $\pm$ SE)			Post Treatment (Mean $\pm$ SE)		
	Group I	Group II	Group III	Group I	Group II	Group III
Haemoglobin	14.96 $\pm$ 0.68	8.66 $\pm$ 1.15	11.45 $\pm$ 1.37	16.08 $\pm$ 0.36 <sup>a</sup>	16.95 $\pm$ 0.33 <sup>ab</sup>	17.36 $\pm$ 0.21 <sup>b</sup>
PCV	41.88 $\pm$ 2.74	32.16 $\pm$ 2.56	31.08 $\pm$ 2.55	44.38 $\pm$ 0.81 <sup>b</sup>	42.36 $\pm$ 0.51 <sup>ab</sup>	41.80 $\pm$ 0.72 <sup>a</sup>
TEC	6.24 $\pm$ 0.64	4.05 $\pm$ 0.40	4.45 $\pm$ 0.65	7.20 $\pm$ 0.13 <sup>b</sup>	6.60 $\pm$ 0.07 <sup>a</sup>	6.80 $\pm$ 0.19 <sup>ab</sup>
MCV	64.80 $\pm$ 1.59	65.40 $\pm$ 3.81	67.51 $\pm$ 1.97	70.38 $\pm$ 1.60 <sup>a</sup>	75.03 $\pm$ 1.39 <sup>a</sup>	71.30 $\pm$ 1.68 <sup>a</sup>
MCH	24.48 $\pm$ 2.14	20.86 $\pm$ 0.97	22.55 $\pm$ 0.48	24.25 $\pm$ 0.71 <sup>a</sup>	24.06 $\pm$ 1.12 <sup>a</sup>	25.68 $\pm$ 0.66 <sup>a</sup>
MCHC	35.08 $\pm$ 0.55	29.88 $\pm$ 1.47	32.18 $\pm$ 0.60	35.00 $\pm$ 0.34 <sup>a</sup>	32.88 $\pm$ 0.92 <sup>a</sup>	34.35 $\pm$ 0.70 <sup>a</sup>
TLC	36.18 $\pm$ 0.96	39.81 $\pm$ 0.40	37.63 $\pm$ 1.13	13.60 $\pm$ 0.55 <sup>a</sup>	16.40 $\pm$ 0.31 <sup>b</sup>	14.70 $\pm$ 0.70 <sup>a</sup>
Neutrophil	78.65 $\pm$ 0.57	79.65 $\pm$ 0.38	77.68 $\pm$ 0.90	68.63 $\pm$ 0.76 <sup>b</sup>	68.53 $\pm$ 0.44 <sup>b</sup>	65.76 $\pm$ 1.26 <sup>a</sup>
Lymphocyte	10.48 $\pm$ 0.50	10.56 $\pm$ 0.26	10.65 $\pm$ 0.34	28.68 $\pm$ 0.29 <sup>ab</sup>	29.03 $\pm$ 0.19 <sup>b</sup>	27.81 $\pm$ 0.42 <sup>a</sup>
Monocyte	9.36 $\pm$ 0.30	9.91 $\pm$ 0.45	8.95 $\pm$ 0.24	7.33 $\pm$ 0.35 <sup>a</sup>	8.45 $\pm$ 0.48 <sup>a</sup>	7.00 $\pm$ 0.62 <sup>a</sup>
Eosinophil	3.06 $\pm$ 0.13	2.93 $\pm$ 0.05	2.82 $\pm$ 0.14	2.18 $\pm$ 0.13 <sup>a</sup>	3.12 $\pm$ 0.12 <sup>b</sup>	2.53 $\pm$ 0.24 <sup>ab</sup>

## Discussions

### Parameters of physiological affected bitches with closed and open pyometra

#### Influence on closed and open cervix pyometra affected bitches on rectal temperature

In present study, pyometra affected bitches the mean rectal temperature was increased before treatment. However, the pyometra affected bitches rectal temperature was 22.22 per cent within normal range. These findings were agreement with Murthy *et al.*, (2013) [18]; Jena *et al.*, (2013) [10].

#### Influence of closed and open cervix pyometra affected bitches on heart rate

The present research protocol was observed heart rate of mean within normal range in all three above groups before treatment. It observed in Jena *et al.*, (2013) [10]. The heart rate was showed slightly increased a total of five bitches (16.66%) might be due to effects of hypovolemia shock and

hyperthermia.

#### Influence of closed and open pyometra affected bitches on respiration rate

The present research protocol was observed respiration rate of mean increased in all three above groups before treatment it might be due to toxemia and infection as correlated with Jena *et al.*, (2013) [10].

#### Parameters of Haematological values in affected bitches with closed and open cervix pyometra

##### Influence of closed and open pyometra affected bitches on Haemoglobin (Hb):

In present research observed haemoglobin mean value decreased in affected bitches with closed and open pyometra before treatment that indicate anaemia that results were correlated with Dabhi *et al.*, (2009) [4]; Mudasar *et al.*, (2011) [17]; Murthy *et al.*, (2013) [18]; Jena *et al.*, (2013) [10] might be due to loss of red blood cells.

### **Influence of closed and open pyometra affected bitches on packed cell volume**

In present research PCV mean value decreased in affected bitches with closed and open pyometra before treatment that indicate a normocytic, normochromic anaemia it was correlated with Ravishankar *et al.*, (2004) [22]; Murthy *et al.*, (2013) [18]; Jena *et al.*, (2013) [10].

### **Influence of closed and open pyometra affected bitches on TEC**

In present research TEC mean value decreased in bitches affected with closed and open pyometra before treatment that indicate anaemia it was correlated with Mudasir *et al.*, (2011) [17]; Yu *et al.*, (2012) [26]; Jena *et al.*, (2013) [10]; Mohan *et al.*, (2014) [16].

### **Influence of closed and open pyometra affected bitches on total leucocyte count**

The present research observed, the most finding among affected bitches with closed and open cervix pyometra was leukocytosis before treatment it was correlated with Murthy *et al.*, (2013) [18]; Jena *et al.*, (2013) [10] and Mohan *et al.*, (2014) [16].

### **Influence of closed and open pyometra affected bitches on DLC**

The present research, observed leukocytosis, monocytosis, absolute neutrophilia with left shift, lymphopenia, eosinophil count important finding in affected bitches closed and open cervix pyometra before treatment it was correlated with Dabhi *et al.*, (2009) [4]; Murthy *et al.*, (2013) [18]; Jena *et al.*, (2013) [10] might be due to retention of pus in uterus resulting into accelerated lymphopenia and granulopoiesis.

### **Parameters of biochemical affected bitches with closed and open cervix pyometra**

#### **Influence of closed and open cervix pyometra affected bitches on BUN and serum creatinine**

The present research, BUN and serum creatinine mean value increased in all above groups of affected bitches with closed and open pyometra pretreatment it was correlated with Bigliardi *et al.*, (2004) [2]; Jena *et al.*, (2013) [10] it might be due to toxemia leading to decomposition of body protein as a result of suppurative process.

#### **Influence of closed and open pyometra affected bitches on serum aspartate transaminase**

The present research, mean serum aspartate transaminase level was increased in all above groups of bitches closed and open cervix pyometra pre treatment was correlated with Jurka *et al.*, 2010) [13] and Jena *et al.*, 2013) [10] it might be due to septicaemia, cellular hypoxia and diminished hepatic circulation in the dehydrated bitches.

#### **Influence of closed and open pyometra affected bitches on serum alanine transaminase**

The present research, mean serum alanine transaminase level decreased in all above groups of bitches affected with closed and open pyometra before treatment it was correlated with Jurka *et al.*, 2010) [13] it might be due to presence of enzyme inhibitors resulting in inhibition of ALT synthesis in liver.

#### **Influence of closed and open pyometra affected bitches on serum alkaline phosphatase**

The present research, mean serum alkaline phosphatase level was increased in all above groups of affected bitches in closed and open cervix pyometra pre treatment it was correlated with

Yu *et al.*, (2012) [26] and Jena *et al.*, (2013) [10] it might be due to hepatic cholestasis caused by septicaemia and endotoxaemia.

### **Conclusion**

Diagnosis of closed and open pyometra was made by previous history, clinical signs, radiography, abdominal palpation, ultrasonography and increased levels in parameters of physiological, haematological and biochemical parameters. The most consistently finding in canine pyometra was leucocytosis with neutrophilia shift to left, monocytosis and lymphopenia. The parameters of physiological observed respiration rate and rectal temperature increased bitches affected with closed and open pyometra before treatment whereas the heart rate didn't show any significant change in parameters. In parameters of haematological observed PCV, haemoglobin, TEC and lymphocyte count decreased indicate normocytic and normochromic anaemia in affected bitches before treatment.

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