HAEMATOLOGICAL PARAMETERS IN DOGS WITH CYSTIC ENDOMETRIAL HYPER-PLASIAPYOMETRA

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Abstract

Changes in haematological parameters in dogs with cystic endometrial hyperplasia-pyometra (CEH-Pyometra)was assessed. Haemoglobin (Hb), volume of packed red cells (VPRC), total erythrocyte count (TEC) and lymphocyte count were found to be decreased while the total leucocyte count (TLC) and neutrophil per cent was increased in dogs withCEH-Pyometra. Erythrocytic indices like mean corpuscular volume (MCV), mean corpuscular haemoglobin (MCH) and mean corpuscular haemoglobin concentration (MCHC) did not show any significant changes in these dogs and were in the normal range. Predominant leucocytosis(mean 25.56±2.24 $\times 10^3/mm^3$)with neutrophilia(mean84.83±1.22 %),lymphopenia (mean 12.33±0.95 %) andnormocytic normochromic anaemiawere the most common findings in bitcheswith CEH-Pyometra.

Key words: *cystic endometrial hyperplasia, anaemia, bitch, leucocytosis, neutrophilia.*

Cystic endometrial hyperplasia-pyometra(CEH- Pyometra) is considered to be an exaggerated response of the uterus to chronic progestational stimulation during the luteal phase of the oestrous cycle, causing an abnormal accumulation of fluid within the endometrial glands and uterine lumen. The disease is associated with a variety of clinical symptoms andhaematological changes and is life-threatening in severe cases. The main haematological feature of the disease is leucocytosis andneutrophila with a left shift (Greene., 2006)

The most common bacteria isolated from the uterus are *Escherichia coli* (*E. coli*) in clinically ill animals.Endotoxemia is believed to be responsible for many of the clinical signs and haematological changes associated with pyometra. Initial haemodynamic changes lead to portal hypertension, hepato-splanchnic pooling of blood and a decrease in central venous blood pressure, cardiac output and systemic blood pressure. These early changes are transitory and normal values are regained, but with inadequate treatment the condition progresses to refractory hypotension.

The present study was undertaken to investigate the alterations in haematological parameters of bitches infected with CEH-

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Pyometra, in order to suggest for improvement of its care and management.

Materials and methods

The present work was carried out at the Department of Animal Reproduction, Gynaecology and Obstetrics, University Veterinary Hospitals, Kokkalai and Mannuthy, Thrissur,Kerala. Twelve bitches less than six years of age with different parity and clinico-gynaecological examination suggestive ofCEH-Pyometra were selected for the study. All the bitches suspected had a vaginal discharge which indicated to suspect a patent cervix and CEH-Pyometra was confirmed by ultrasonography.

Blood samples for haemato-logicalanalysis were obtained from the distal cephalic vein prior to initiating any treatment and collected into 2ml EDTA (JK diagnostics) and non-additivevacutainer tubes(Safe lab clot accelerator 4ml vial,CML Biotech Pvt. Ltd). The haematological parameters studied were Haemoglobin (Hb), Packed Cell Volume (PCV),Mean Corpuscular Volume (MCV),Mean Haemoglobin Concentration (MCH),Mean Corpuscular Haemoglobin Concentration (MCHC), Total Leukocyte Count (TLC), Differential Leukocyte Count (DLC), Total Erythrocyte Count, Erythrocyte Sedimentation Rate (ESR) and Platelet count. The values obtained for each parameter was compared with the reference values as per The Merck's Veterinary Manual (2010) and statistical analysis was done by SPSS (Version 21).

Results

In dogs withCEH-Pyometra the mean TLC ($25.56\pm2.24\times10^3/mm^3$) was increased andthe mean TEC ($4.68\pm0.27\times10^6/mm^3$) was decreased (Table 1).The DLCrevealed an increased mean neutrophil count (84.83±1.22 %), a normal mean eosinophiliccount(2.83±0.41%) and a decreased mean lymphocyte count(12.33±0.95%). A low mean haemoglobin level (11.48±0.48 g%), low mean VPRC value (32.51±1.38%)and a decreased mean platelet count ($236.67\pm35.19\times10^3/mm^3$) werealso observed in these dogs. Normal MCV (mean66.74±1.46fl), MCH (mean 20.77±0.97pg), MCHC(mean31.07±1.05g/dl)values revealed that the type of anaemia in CEH-Pyometra affected animals was normocytic normochromic. ESR values were elevated (mean 16.67±1.84 mm/h) indicative of an inflammation.

Discussion

Leucocytosis was a constant finding in dogs with CEH-Pyometra and can be attributed to the reaction of defence mechanism to the invading micro-organism (Hagman *et al., 2009)*. Normal leucograms with mild to moderate

Table 1 : Haematological parameters in cystic endometrial hyperplasia-pyometra affected dogs

PARAMETER	RANGE	MEAN±SE
Total leucocyte count ($10^3/mm^3$)	16.5-44.2	25.56±2.24
Neutrophils (%)	77-91	84.83±1.22
Eosinophils (%)	1-6	2.83±0.41
Lymphocytes (%)	8-17	12.33±0.95
Erythrocyte sedimentation rate (mm/h)	10-32	16.67±1.84
Total erythrocyte count ($10^6/mm^3$)	2.1-6.96	4.68±0.27
Haemoglobin (%)	8.8-13.6	11.48±0.48
Volume of packed red cells (%)	27.2-42.4	32.51±1.38
MCV (fl)	55.9-73.9	66.74±1.46
MCH (pg)	16.3-25.1	20.77±0.97
MCHC (g/dl)	24.1-34.5	31.07±1.05
Platelet count ($10^3/mm^3$)	180-521	236.67±35.19

normocytic normochromic anaemia (PCV: 30–35%) might be due to the chronic nature of the disease and toxic suppression of the bone marrow (Vestergen*et al.,*2008)

The mean TEC value was lower than normal and mean haemoglobin was more towards lower physiological levels suggestive of the existence of anaemia in the CEH-Pyometra affected animals and these observations are in agreement with several authors(Hagman*et al.,* 2006a and Greene, 2006).Anaemia in pyometra is caused by a variety ofdisordersincluding chronic inflammation inwhich acute phase proteins mediate an iron sequestration in the bone marrow, leadingiron deficiency, suppression of bone marrow by the circulating endotoxins and loss of red cells into the uterine lumen as reported by Okano *et al.*(1993).

MCV, MCH and MCHC in the haemoglobin concentration (MCHC) were within normal range in all animals indicating normocytic normochromic anaemia. These findings were in accordance with the previous reports by Bigliardi*et al.*(2004).However, normal level of haemoglobin and VPRC was observed in some of the CEH-Pyometra affected bitches which is attributable to concurrent dehydration (Schepper*et al.,* 1987).

Thrombocytopenia observed in the present study was also earlier reported by Memon and Mickelsen (1993) and Murthy *et al.* (2013)which might be due to the adverse effect of endotoxins on the bone marrow interfering in the synthesis of platelets.

All affected animals had neutrophilia which is attributableto retention of purulent exudates in the uterus which exerts a chemotactic effect on neutrophils resulting into accelerated granulopoisis(Nath*et al.,* 2009)or influence of toxins in pyometra (Hagman *et al.,* 2006b).Normal eosinophilc counts observed in the study was also reported byDhabi *et al*.(2009).

Lymphopenia observed in the study, was alsodocumented in previous reports andthis could be attributed to either absolute increase in neutrophil count as a result of severe suppurative inflammation of the uterus or due to toxic suppression oflymphocyte activity(Kashinath *et al.,* 2009). ESR values were elevated in all the affected animals which might be due to uterine inflammation and infection.

The result of the present study signifies the haematological alterations like predominant increase in leucocyte count with neutrophilia, lymphopenia, normal eosinophilic count andnormocytic normochromic anaemia inCEH-Pyometra affected bitches.

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