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Clinical and haemato biochemical parameters of open vs. closed pyometra in canines

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Abstract

Pyometra is a life-threatening reproductive disease characterized by accumulation of pus in the uterus of intact bitches. The study was conducted on 12 cases of canine pyometra viz., open (n=6) and closed (n=6) pyometra at teaching veterinary clinical complex, College of Veterinary Science, Tirupati. The hematological parameters revealed severe anemia, leukocytosis with shift to left. The serum biochemical parameters estimations revealed slight elevation in alkaline phosphate (ALP), alanine aminotransferase (ALT) but no marked difference in blood urea nitrogen (BUN) and creatinine values between the two groups. In the present study there was no significant difference in haemato biochemical parameters between open and closed pyometra. However, the uterine sac diameter of open and closed pyometra differ significantly ($p < 0.05$).

Keywords: Biochemical, hematology, pyometra, ultrasound

Introduction

Canine pyometra is the condition characterized with accumulation of purulent secretions in the uterus of bitches with an open (open pyometra) or closed cervix (closed pyometra) mostly occur during diestrus *i.e.*, during progesterone dominant phase. Generally, the cervical canal opens in response to estrogen and closes in response to progesterone, which are ovarian hormones (Lee *et al.*, 2016) [4]. Estrogen works by relaxing the cervix, allowing the microorganisms of vaginal microbiota to enter the uterus during proestrus and estrus, and increasing the number of progesterone receptors in the endometrium, which leads to the proliferation of endometrial glands and enhancement of their function resulting in intensification of fluid secretion besides causing the closure of cervix during diestrus. Secretion provides an environment favorable to bacterial growth and associated with reduced inflammatory response, favors the establishment of disease. (Anjos *et al.*, 2021) [2].

In open cervix pyometra the clinical signs include pyrexia, vomitions, anorexia, foul odour discharges from vagina whereas the clinical signs of closed cervix are inappetence, vomitions, polydipsia, distension of abdomen. Between the both conditions closed cervix pyometra is more dangerous as there is no outlet for the pus so immediate diagnosis and treatment are necessary to prevent further complications which leads to death of the animal.

When it comes to diagnosis the estimation of haemato biochemical parameters, ultrasonography and radiography are the best diagnostic aids.

The most followed treatment modality for bitches with closed pyometra is complete ovariectomy whereas in open pyometra medical treatment in a combination of antiprogesterones, antiprolactins, prostaglandins and antibacterial drugs are used based on severity.

Materials and Methods

The present study was conducted on 12 dogs where they were divided into 2 groups in which group 1 (n=6) had open and group 2 (n=6) had closed pyometra at teaching veterinary clinical complex, College of Veterinary Science, Tirupati. Blood samples were collected in vials containing EDTA for hematological evaluation. Serum was collected in separate vacutainers without anticoagulant for biochemical analysis. The statistical analysis was done through the SPSS version 24 by using independent sample t-test.

Results and Discussion

According to the result of the study both open and closed pyometra cases had anemia with lower Hb, TEC than normal ranges. The total leukocyte count of both groups showed leukocytosis along with neutrophilia, shift to left. The range of leukocytosis and percentage of band cells were more in closed pyometra indicating its severity. The biochemical parameters give an idea about the extent of damage that occurred due to the endotoxins released by disease causing bacteria. The mean serum BUN, creatinine, ALP, ALT values are slightly higher than the normal values. However, there was no significant difference in the hemato biochemical parameters between open and closed pyometra.

On ultrasonographic examination the mean uterine horn diameter of closed pyometra was more than the open pyometra showing a significant difference ($p < 0.05$) between them (Lee *et al.*, 2016)^[4]. (Table 1).

Table 1: Clinical, laboratory and USG parameters

Parameters	Open	Closed
Temperature (°F)	101.06±0.37	101.16±0.53
TEC (10 ⁶ /µl)	3.33±0.27	4.8±0.65
TLC (10 ³ /µl)	27.166±3.01	32.75±3.19
Hb (%)	9.1±0.69	9.9±1.25
Neutrophils (%)	84.83±1.18	81.66±6.40
Band cells (%)	10.9±2.50	12.93±14.93
ALP (U/L)	179±22.81	270±42.62
ALT (U/L)	91.16±15.14	125.16±14.93
BUN (mg/dl)	26.5±1.56	45±4.19
Creatinine (mg/dl)	1.053±0.17	1.19±0.17
Uterine horn diameter (mm)	14.35±0.85	27.11±2.71*

Conclusion

From the present study we can conclude that there was difference in haemato biochemical parameters and uterine horn diameter of open and closed cervix pyometra. And when we compare between the 2 groups the values were more in closed pyometra than open indicating the severity of closed cervix pyometra. According to this study haemato biochemical parameters along with ultrasonographic findings helps as good diagnostic tools for pyometra diagnosis and also useful to know the disease severity. By knowing these conditions, we can choose the line of treatment and estimate the prognosis of the disease.

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