

## COMPARATIVE EVALUATION OF HAEMATOLOGICAL PARAMETERS IN HEALTHY AND PYOMETRA AFFECTED BITCHES

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### ABSTRACT

Haematological parameters were evaluated in 14 pyometra and 10 healthy bitches before and after ovario-hysterectomy. The Hb and TEC values were significantly ( $P < 0.01$ ) lower in pyometra bitches than in healthy bitches. The mean PCV value was significantly ( $P < 0.01$ ) higher and that of ESR lower in healthy bitches as compared to pyometra ones. There was slight improvement in the Hb, TEC and ESR at 15 days post-operative period, but not in PCV, in pyometra bitches. The values of PCV were identical, but the ESR was apparently higher in closed than the open pyometra. The mean TLC recorded in pyometra bitches was significantly ( $P < 0.01$ ) higher than that in the normal bitches. Moreover along with a marked leucocytosis, neutrophilia ranging from 60 to 86 per cent was also observed in pyometra bitches. The mean percentage of neutrophil count was significantly ( $P < 0.01$ ) higher ( $74.30 \pm 1.75$  vs  $57.80 \pm 0.76$  %) and lymphocyte counts lower ( $22.07 \pm 1.59$  vs  $37.70 \pm 0.58$  %) in pyometra bitches than the normal ones. These findings were of prognostic value in diagnosing canine pyometra.

**Key words:** Bitch, Pyometra, Haematology, Ovario-hysterectomy.

One of the meticulous life-threatening reproductive disorders in pet bitches is pyometra altering haemato-biochemical profile and creating clinical manifestations. The aim of this study was to compare haematological profile of pyometric and healthy bitches before and after ovario-hysterectomy, so as to evaluate its prognostic significance.

Twenty-four pet bitches presented for treatment of pyometra ( $n=14$ ) or spaying ( $n=10$ ) at Veterinary Teaching Clinical Services Complex of the College at Anand during the year 2004-05 were included in this study. Following retrieval of detailed history of each

patient from the owner and its clinical and radiological examinations, ovario-hysterectomy was performed as per the technique described by Bojrab (1985) through a mid-line approach as a treatment of pyometra or for elective sterilization. From all the bitches, whole blood samples were collected from cephalic vein in vials containing EDTA twice, i.e. just before operation and 15 days after the ovario-hysterectomy for evaluation of haematological parameters, viz. Hb, PCV, ESR, TEC, TLC and DLC (Jain, 1986). Data so obtained of individual bitches with open pyometra (10), closed pyometra (4) and normal spaying (10) pre- and post-operatively were analyzed by standard statistical method using completely randomized design and 't' test (Snedecor and Cochran, 1980). Haematological profile observed before and after ovario-hysterectomy in bitches affected with open and closed pyometra and those normal ones is presented in Table 1.

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### Haemoglobin and Total Erythrocyte Count

The mean values of haemoglobin (Hb) and total erythrocyte count (TEC) observed in bitches with pyometra were significantly ( $P < 0.01$ ) lower than those in healthy ones. The Hb content varied from 5.80 to 16.00 g per cent and TEC 3.14 to 8.60 million/cmm among bitches with pyometra suggesting anaemic condition in some of affected bitches. Further, values of both these parameters were non-significantly higher in cases of closed pyometra than the open ones. These observations on Hb compared well with the reports of Wakankar (1993), Gandotra *et al.* (1994), Dave (2002) and Rao *et al.* (2002), but the values of TEC were little higher than their findings. Hagman (2004), however, recorded Hb content of 17.3 and 13.6 g per cent in healthy and pyometric bitches.

The anaemic condition of affected bitches observed could be due to loss of red blood cells by diapedesis into uterine lumen (Borresen and Skrede, 1980; Stone, 1995), apart from depressed feed intake and erythropoiesis under toxæmic condition in severely affected cases. The improvement in the levels of both Hb and TEC observed after surgery is conceivable as it removed the diseased organ and toxic exudates and was substantiated by lack of such variation after surgery among normal spayed bitches.

### Packed Cell Volume and Erythrocyte Sedimentation Rate

The mean pre-operative packed cell volume (PCV) was significantly ( $P < 0.01$ ) lower and erythrocyte sedimentation rate (ESR) was higher in pyometric bitches as compared to healthy ones. There was slight improvement in the ESR post-operatively over pre-operative values in bitches with pyometra. No such change was observed in normal spayed bitches (Table 1).

These findings of PCV and ESR corroborated with the previous reports (Dow, 1957; Borresen and Skrede, 1980; Bojrab, 1985 and Wakankar, 1993). In their opinion, the PCV may be less than 36 per cent in bitches with pyometra because of normochromic normocytic

anaemia. Rao *et al.* (2002), however, observed mean PCV of only 28 per cent in bitches with pyometra. The significantly raised ESR in some of the cases, particularly in closed pyometra, was probably associated with acute endometritis and toxæmia as revealed by Dow (1957). The apparently lower ESR with identical PCV observed at post-operative stage as compared to pre-operative values in this study could signify the removal of toxic material.

### Total and Differential Leukocyte Count

The mean total leukocyte count (TLC) recorded in bitches with pyometra was significantly ( $P < 0.01$ ) higher than that in the healthy bitches. There was no difference in the TLC values of open and closed pyometra. There was significant ( $P < 0.05$ ) reduction in the TLC at 15 days of ovario-hysterectomy as compared to pre-operative values, and no such change was observed in healthy bitches before and after ovario-hysterectomy (Table 1). A marked leucocytosis has also been reported as a constant feature in bitches with pyometra by many previous workers (Borresen and Skrede, 1980; Murugavel *et al.*, 2001; Hagman, 2004). In the present study, TLC count ranged from 11,500 to 54,000 per cmm in bitches affected with pyometra, however, no distinct feature was observed between close and open pyometra cases in their TLC counts. Dave (2002) and Hagman (2004), however, recorded marked increase (almost double) in WBC count in cases of closed than the open pyometra. Leucocytosis depends upon the severity of inflammation (Hagman, 2004).

Along with marked leucocytosis significant increase in neutrophil count was observed in bitches with pyometra than the healthy ones ( $74.30 \pm 1.75$  vs  $57.80 \pm 0.76$  %). In contrast, the lymphocyte count of pyometra affected and normal bitches averaged  $22.07 \pm 1.59$  and  $37.70 \pm 0.58$  per cent, respectively. Thus, a marked neutrophilia and lymphopenia with left shift was a feature of pyometra in bitches. There was non-significant difference in the DLC values between open and closed pyometra. At 15 days post-operative period the shifting towards normalcy was faster in cases of open pyometra than the closed one (Table 1). These

findings of neutrophil percentage in bitches with pyometra were slightly lower than those reported by Wakankar (1993) and Dave (2002). They also reported severe neutrophilia with left shift in cases of closed pyometra as compared to open ones. This was, however, not distinctive in the present study. Sevelius *et al.* (1990), Hagman (2004) and Arora (2005) observed marked leucocytosis with neutrophilia, a left shift to immature forms and substantial monocytes in most cases of pyometra, and the prognosis was poor for animals with leucopenia with a left shift.

The percentages of monocytes, basophils and eosinophils were similar in affected and healthy bitches ( $2.00 \pm 0.21$ ,  $0.64 \pm 0.13$  and  $1.00 \pm 0.10$  vs.  $2.30 \pm 0.21$ ,  $1.00 \pm 0.26$  and  $1.30 \pm 0.15$ , resp). Wakankar (1993) and Dave (2002) also reported comparable findings in normal and pyometric bitches.

It was concluded that significant decline in Hb, PCV and TEC with marked elevation of TLC and ESR in bitches with pyometra suggested toxemia. Hence, these parameters could be used as good probe to diagnose the condition. Marked leucocytosis and neutrophilia observed in pyometra declined post-operatively suggesting reversal of toxemia.

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