



ISSN (E): 2277-7695

ISSN (P): 2349-8242

NAAS Rating: 5.23

TPI 2023; 12(2): 2056-2057

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www.thepharmajournal.com

Received: 25-11-2022

Accepted: 29-12-2022

Mallikarjun

Department of Veterinary Surgery and Radiology, Veterinary College, Karnataka Veterinary Animal and Fisheries Sciences University, Bidar, Karnataka, India

BV Shivaprakash

Director of Research, KVAFSU, Bidar, Karnataka, India

D Dilipkumar

Dean, Veterinary College, Karnataka Veterinary Animal and Fisheries Sciences University, Bidar, Karnataka, India

B Bhagavantappa

Department of Veterinary Surgery and Radiology, Veterinary College, Karnataka Veterinary Animal and Fisheries Sciences University, Bidar, Karnataka, India

B Kavita Rani

Department of Veterinary Pathology, Veterinary College, Karnataka Veterinary Animal and Fisheries Sciences University, Bidar, Karnataka, India

Vivek R Kasaraliker

Department of Veterinary Medicine, Veterinary College, Karnataka Veterinary Animal and Fisheries Sciences University, Bidar, Karnataka, India

MD Suranagi

Department of Animal Genetics and Breeding, Veterinary College, Karnataka Veterinary Animal and Fisheries Sciences University, Bidar, Karnataka, India

Corresponding Author:

Mallikarjun

Department of Veterinary Surgery and Radiology, Veterinary College, Karnataka Veterinary Animal and Fisheries Sciences University, Bidar, Karnataka, India

Evaluation of biochemical parameters in dogs undergoing ovariohysterectomy

Mallikarjun, BV Shivaprakash, D Dilipkumar, B Bhagavantappa, B Kavita Rani, Vivek R Kasaraliker and MD Suranagi

Abstract

Eighteen clinical cases of dogs were divided into three groups (Group A, B, and C) consisting of six dogs in each group. Right flank ovariohysterectomy operation was performed in all eighteen dogs under inj. atropine, xylazine and propofol anaesthesia. Biochemical parameters were evaluated pre-operatively, day 0, 7, 14 and 30 post-operatively. C- reactive protein (mg/L), alkaline phosphatase levels (IU/L), Alanine transaminase (IU/L) and total protein (g/dL) fluctuated within normal physiological limits at various intervals of the study.

Keywords: Biochemical parameters, dogs undergoing ovariohysterectomy, CRP

Introduction

In the present study, healthy dogs which were presented for birth control were used for the study. C-reactive protein (CRP) is the fastest-reacting acute phase protein, which rises in response to infection and tissue injury (Conner *et al.*, 1998) [1]. C-reactive protein highly sensitive indicator of the presence and severity of the infection. CRP has been defined in humans as a sensitive systemic marker of inflammation and tissue damage (Pepys and Hirschfield 2003) [8]. CRP levels may be a more accurate indicator of differences in surgical trauma (Michelsen *et al.*, 2012) [7]. Serum alkaline phosphatase activity is a very helpful serum biochemical indicator of liver illness especially cholestatic disease, increased alkaline phosphatase activity can be seen in neoplasia, endocrine abnormalities, bone disease and other conditions (Fernandez and kidney, 2007) [3]. Total protein helps to measure the patient's health status.

Materials and Methods

The study was conducted on 18 female dogs presented for ovariohysterectomy. The cases were randomly divided into three equal groups of six animals each. Pre-operatively respiratory rate, heart rate and rectal temperature were recorded. Biochemical values such as C- reactive protein (mg/L), alkaline phosphatase levels (IU/L), Alanine transaminase (IU/L) and total protein (g/dL) were estimated on pre-operative, day 0, 7, 14 and 30 post-operatively using a biochemical analyzer (ELITech Group Microlab300). Withholding of food and water was advised to the pet owners for 12 and 6 hours respectively. The right flank was shaved. The operative site was scrubbed using chlorhexidine solution, surgical spirit and povidone iodine. All the animals were given inj. ceftriaxone sodium @ 25 mg/kg body weight i/v and meloxicam 0.2 mg/kg body weight i/m pre-operatively. The dogs were premedicated with inj. atropine sulphate @ 0.045 mg/kg im, inj. xylazine hydrochloride @ 1 mg/kg iv. Induction of anesthesia was done using propofol @ 3 mg/kg iv and maintained with isoflurane 2-3%. An ovariohysterectomy operation was performed following the right flank approach. The ovarian end was ligated with chromic catgut size 0, abdominal muscles were sutured using polyglytone 6211 synthetic monofilament absorbable suture. The skin wounds were closed with 2-octyl cyanoacrylate glue, surgical staples and polyglactin 910 (Mitsu FST) in groups A, B and C respectively.

Results and Discussion

Table 1: Mean±SE values of biochemical parameters in dogs of groups A, B and C

Parameters	Groups	Pre-operative	Day 0	Day 7	Day 14	Day 30
C-reactive protein (mg/L)	A	3.38 ^a ±0.08	3.63±0.08	3.95 ^{**} ±0.09	3.67 [±] 0.08	3.52 ^a ±0.11
	B	3.700 ^b ±0.07	3.92±0.07	3.98 ^{**} ±0.05	3.73±0.04	3.85 ^b ±0.07
	C	3.72±0.08	3.90±0.09	4.17 ^{**} ±0.08	3.92±0.11	3.52±0.08
Alkaline phosphatase (IU/L)	A	80.67 ^a ±0.76	81.83 ^a ±0.70	83.33 ^a ±0.49	82.67 ^a ±0.49	82.83 ^a ±0.70
	B	83.33 ^b ±1.26	86.17 ^b ±1.1	87.83 ^b ±1.01	87.17 ^b ±0.48	86.00 ^b ±0.58
	C	87.83 ^c ±0.70	86.67 ^c ±0.67	87.17 ^c ±0.79	86.33 ^c ±0.67	88.17 ^c ±0.48
ALT (IU/L)	A	38.17 ^a ±0.70	37.50 ^a ±0.99	38.83 ^a ±0.47	41.17 ^{**a} ±0.48	41.00±1.46
	B	42.50 ^b ±0.43	43.83 ^b ±0.54	44.83 ^b ±2.30	48.00 ^{**b} ±2.08	47.17 ^b ±2.49
	C	38.33 ^c ±0.80	39.17 ^c ±0.65	38.83 ^c ±0.307	40.00 ^c ±0.52	40.50 ^c ±0.56
Total protein (g/L)	A	5.71±0.07	5.57±0.04	5.23 ^{**a} ±0.04	5.25 ^{**a} ±0.08	5.53 ^a ±0.07
	B	5.50±0.07	5.38±0.12	5.78 ^b ±0.19	5.68 ^b ±0.08	5.68±0.12
	C	5.53±0.08	5.67±0.05	5.75 ^c ±0.06	5.72 ^c ±0.07	6.02 ^c ±0.15

*=Means bearing superscript *differs significantly ($p \leq 0.05$) from preoperative within the group.

**=Means bearing superscript **differs significantly ($p \leq 0.01$) from preoperative within the group.

a, b, c = Means bearing superscript a, b, c differs significantly ($p \leq 0.05$) between groups A, B and C at corresponding intervals.

The Mean±SE value of C-reactive protein differed significantly ($p \leq 0.01$) on day 7 post-operatively when compared to the pre-operative value. However, the values fluctuated within normal physiological limits at various intervals of the study this might be due to lesser trauma to the tissue during ovariohysterectomy surgery. Conner *et al.*, 1998^[1] reported that increase in CRP level at 24 hrs to 48 hrs after the left flank method of ovariohysterectomy compared to the laparoscopic method. Ranganath and Senthil 2006^[9] reported that increase in CRP in mongrel bitches at 24 hrs in the surgical methods of ovariohysterectomy might be due to greater tissue damage and inflammatory response. Michelsen *et al.*, 2012^[7] reported that bitches sterilized by inexperienced surgeons had a significantly greater rise in CRP at 4 and 6 hr post-surgery whereas, CRP was not affected when ovariohysterectomy was conducted by an experienced surgeon. Jarolmasjed and Alizadeh 2017^[5] reported that serum CRP levels were lower in the ovariohysterectomy if a uterine hook was used by a competent and skilled surgeon, exteriorizing the horns of the uterus using a hook during ovariohysterectomy may result in a shorter abdominal incision and less trauma and surgical stress. The Mean±SE value of alkaline phosphatase differed significantly on day 7 in groups A and B and also on day 14 in group B when compared to pre-operative values. The values fluctuated within normal physiological limits. Fernandez and kidney, 2007^[3] opined that alkaline phosphatase activity is a very helpful serum biochemical indicator of liver illness, especially cholestatic disease. ALT and total protein fluctuated within normal physiological limits. Gunay *et al.*, 2011^[4] reported that there was no significant difference between pre and post-operative ALT and total protein levels in 30 bitches which has undergone ovariohysterectomy. Kumari *et al.*, 2018^[6] and Farokhzad *et al.*, 2021^[2] reported no significant changes in total protein and ALT after ovariohysterectomy.

Conclusion

C-reactive protein, Alkaline phosphatase, Alanine transaminase and total protein values were within the normal range on days 0, 7, 14 and 30 post-operatively in all 18 dogs that have undergone ovariohysterectomy.

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