CONTENTS

Effect of Partial Replacement of Cereal Grains with Bakery Waste on Performance of Growing Kids
1-6

Effect on Physiological Parameters on Reversal of á-2 Agonist Using Antagonist in Canines
S.D. Chepte, M.G. Thorat, M. F. M. Siddiqui and S. G. Deshmukh
7-12

Extent of Knowledge of Buffalo Dairy Entrepreneurs Regarding Scientific Feeding Practices
Sangram Chavan¹*, D. S. Deshmukh¹ Manish Sawant ²
13-18

Efficacy of Aloe Vera and Citric Acid for the Healing of Chronic Wound in Bovines
19-23

Histological and Histochemical Study of Corpora Amylacea in Sheep
*Modekar S. S., Dhande, P. L. and Moregaonkar S. D.
24-26

FMD Vaccination Effect on Neat Semen Parameters of Pandharpuri Buffalo Bulls
*R. R. Shelar¹, S. U. Gulavane¹, P. L. Dhande², M. P. Sawane³ S. S. Chaugule⁴ and Getanjali Sachdeva⁵
27-30

Haemato-Biochemical Studies on Dogs Undergoing Butorphanol-Dexmedetomidine-Propofol Anaesthesia during Various Laparoscopic Sterilization Procedures
31-37

Relationship of Testicular Biometry with Body Weight, Scrotal Circumference in Pre and Post Pubertal Osmanabadi Bucks
38-44

Enhancement of Conception Rate Through Luteotropic Hormones in Non-infectious Repeat Breeding Buffaloes on Field Level
45-47

Observations on Effect of Therapeutic Management on Left Ventricular Systolic Time Intervals in Dilated Cardiomyopathy of Dog
R. D. Velhankar, D. V. Keskar, R. V. Gaikwad and A. Samad
48-53
SHORT COMMUNICATION

Surgical Management of Acquired Cleft Palate in a Persian Cat
A. A. Datir, E. G. Thomas, D. Bukhari, D. U. Lokhande, G. S. Khandekar, S. D. Tripathi,
A. A. Pawar and S. U. Raut

Hepatozoon Canis Infection in a Non Descript Dog : Clinical and
Haematobiochemical Study
*V. S. Dhaygude¹, P. D. Pawar², N. P. Surwade¹, S. B. Swami³, V. B. Radkar³

Surgical Removal of Fibrosarcoma in a Dog - A Case Study

Surgical Removal of Trichoblastoma Tumor in a Dog - A Case Study
M. K. Tiwari, G. S. Khandekar, K. S. Chaudhari, D. U. Lokhande, M. S. Rajhans,
S. V. Gaikwad and A. A. Datir

Ileo-caecal Resection in a Chow Chow
G. S. Khandekar, Niharika Sawant, Siddhi Anekar, S. D. Tripathi and K. S. Chaudhary and A. A. Datir

Surgical Management of Lacerated Crop in an Indian Rock Pigeon (Columba livia)

Squamous Cell Carcinoma of Vulva in a Mare
S. B. Akhare, S. V. Upadhye, B. M. Gahlod, S. P. Salvekar and M. S. Dhakate
Effect of Partial Replacement of Cereal Grains with Bakery Waste on Performance of Growing Kids

Department of Animal Nutrition,
Bombay Veterinary College, Parel, Mumbai - 400 012.
*Corresponding author : drmgadegaonkar@gmail.com

ABSTRACT

The study involved 18 growing kids, average age around 130 days and 7.82 kg body weight. The kids were selected on the basis of age, weight and sex. The selected kids were assigned randomly into three experimental groups (group I, II and III) of 6 kids each in a completely randomized design for 91 days. Group I was considered as control and received concentrate mixture (maize grain 50, tur chuni 10, coconut cake 23, wheat bran 10, pellets 5, mineral mixture 1 and salt 1%). Group II and III were fed with same concentrate mixture as control group in which maize grain was replaced by bakery waste at 15 and 30% level, respectively. All the experimental groups received Para grass (Urochloa mutica) as a source of roughage. Average DMI, percent DMI, DMI intake per unit metabolic body size (W0.75 kg), TDNI and DCPI of kids from group III was significantly lower (P<0.01) than group I and II, however, difference between later was comparable. Dietary treatments did not affect average gain in weight and feed conversion efficiency in terms of DM, TDN and DCP per kg gain in weight. The nutrient digestibility was slightly higher for diets containing bakery waste than that of control diet. Feed cost per kg gain was also found to be lowest in group III followed by group II and I. Thus, it can be concluded that maize grain can be replaced by bakery waste up to 30% level, in the concentrate mixture of growing kids without affecting weight gain, feed efficiency and digestibility of nutrients and also for reduction of production cost of growing kids.

Key words : Kids, cereal grains, bakery waste, growth

INTRODUCTION

Shortage of grains for animal feeding necessitate use of alternative energy sources for economic livestock production. Among the alternative foods, bakery waste stands out for its high concentration of non-fibrous carbohydrates, which are characterized as energetic food (Arosemena et al.,1995). Due to its high energetic value it can partially replace cereal grains used in feeding farm animals. Bakery waste is a potential substitute of cereal grains in animal diets. Bakery waste can be composed of cake leftovers, pieces of bread, biscuits, or non-marketed products that have exceeded the expiration date, besides the wastes due to breaking, excess or lack of cooking during processing. Bakery wastes have no other definite use and have no value as human food. They are easily and abundantly available at a rate cheaper than that of maize and other conventional cereal grains. Bakery waste has good potential as alternative source of energy in livestock feeding particularly when conventional cereals becomes costly during certain periods of year. Keeping in view of the above facts, the study was designed to investigate the effect of substitution of cereal grain (maize) with various level of bakery waste in concentrate mixture of growing kids.
MATERIALS AND METHODS

The study involved 18 growing kids selected on the basis of age, weight and sex. The selected kids were divided into three groups viz, I, II and III of six each. Group I received control concentrate mixture (maize grain 50, tur chuni 10, coconut cake 23, wheat bran 10, pellets 5, mineral mixture 1 and salt 1% ). Whereas, Group II and III were fed with control concentrate mixture in which maize grain was replaced by bakery waste at 15 and 30% level, respectively. Formulation of experimental concentrates used for different groups is given in Table 1. Para grass (*Urochloa mutica*) was used as a source of roughage fed and was offered *ad libitum* for all the three groups. Animals were offered a diet consisting of concentrate mixture and green fodder to meet their nutrient requirements (ICAR,1998). Conventional practice of feeding concentrates and roughages separately was followed throughout the experiment. The experimental animals were housed in ideal sheds with proper ventilation and flooring arrangements. The managerial practices remained the same for all the groups except feed treatment. Normal standards of hygiene, management, feeding practices, vaccination and deworming programmes were followed for all the experimental growing kids throughout the experimental period. The kids from all the groups were weighed by using electronic weighing balance of 150 kg capacity. Week wise daily dry matter intake by kids was measured for all groups and presented as % DM intake, absolute DM intake and as DM intake/ unit metabolic body size. Week wise efficiency of feed utilization in terms of DM, TDN and DCP intake per kg gain in weight was calculated. The experiment lasted for 13 weeks. During the last week, a digestibility trial of seven days duration was conducted with total collection method to study the digestibility of various nutrients from different feeding treatments. The economics of body weight gain in all the groups was also studied over the feed cost. The proximate analysis of the experimental diets was carried out according to (AOAC, 2000). Observations of various parameters recorded during experimental period were tabulated and data were statistically analyzed as per Snedecor and Cochran (1994) by using Randomized Block Design.

RESULTS AND DISCUSSION

The average chemical composition of bakery waste, maize grain (%DM) and experimental concentrate mixtures and Para grass is given in Table 2 and 3, respectively.

The overall performance of kids from different groups is presented in Table 4. The average week wise body weight was significantly (P<0.1) higher in group I followed by group II and III, respectively. The average weekly gain in weights of kids from various experimental groups was comparable. Similar results were observed by Afzalzadeh *et al.* (2007) who reported comparable average daily gain in Zandi lambs supplied with diets containing 0, 6, 12.5 and 25% of bakery waste. The average DMI, percent DMI, DMI intake per unit metabolic body size (W0.75 kg), TDNI and DCPI of kids from group III was significantly lower (P<0.01) than group I and II. However, difference in DM intake between group I and II was found to be non-significant. In agreement to the result of the present experiment, Haddad and Ereifej (2004) also observed reduced DM intakes in goat kids fed bread byproduct at level of 30% DM versus kids fed lower levels of bread byproduct (0, 10, or 20% DM). Hetherington *et al.* (2002) reported significantly lower (P<0.05) feed intake in sheep supplied with diet in which bread was included at 50% when compared with diet containing bread at 0 and 25% group. In contrast, Hindiyeh *et al.* (2011) substituted bakery waste for barley grains by 0, 10, 20 and 30% of the diet DM in the fattening diets of Awassi lambs and observed decrease in DMI (P<0.05) in control diet.

The efficiency of feed utilization in terms of DM, TDN and DCP required per kg gain in weight was numerically higher in control group than group II and III. However, the effect was not statistically significant among different treatment groups Passini *et al.* (2001) reported no significant difference in feed conversion in Holstein steers fed on concentrate mixture in which corn was replaced with bakery waste at 0, 10, 20 and 30% levels. Similarly, Afzalzadeh *et al.* (2007) observed no significant difference in feed conversion ratio in Zandi lambs fed on diets containing 0, 6, 12.5 and 25% of bakery waste. In contrary, Hazanzadeh *et al.* (2012) reported higher feed conversion ratio in Sarabi steers fed on ration containing 30% of bread waste (P<0.01).
The Average percent digestibility coefficients, a TDN and DCP content for experimental feeds are given in Table 5. The digestibility trial conducted during last week of the experiment revealed that the overall digestibility of all the nutrients was comparable among different experimental groups. The TDN and DCP contents of ration for group I, II and III were 64.60, 64.90 and 66.10 % and 7.58, 7.61 and 7.81 %, respectively indicating that TDN and DCP contents of group III, receiving 30% BW, was higher than group I and II which received 0 and 15% replacement of bakery waste, respectively. Similar findings were observed by Champe and Church (1980) who observed increase in DM, OM and CP digestibility, when bakery by-product was fed to sheep at levels of 20 or 40% of dietary DM compared to the basal diet.

During the present experiment, per kg cost of bakery waste and maize grain was Rs. 6.00 and 17, respectively. Economics of the study revealed that the cost of concentrate mixture, average daily feeding cost per day and feed cost per kg gain was reduced to a greater extend in group III with 30% bakery waste replacement followed by group II with 15% bakery waste replacement in comparison to control group.

**CONCLUSION**

It was concluded that maize grain of concentrate mixture can be replaced by bakery waste up to 30% level for growing kids without affecting the performance and reducing the cost of production.

**ACKNOWLEDGEMENT**

This current study was conducted in the Instructional Livestock Farm of Bombay Veterinary College, Parel, Mumbai- 400 012The authors are grateful to Professor of Livestock Production and Management for providing kids and necessary facilities.

**REFERENCES**


### Table 1. Formulation of experimental concentrates used for different groups

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>Control</th>
<th>Treatment I (15% BW)</th>
<th>Treatment II (30% BW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize grain</td>
<td>50</td>
<td>42.5</td>
<td>35</td>
</tr>
<tr>
<td>Bakery waste</td>
<td>-</td>
<td>7.5</td>
<td>15</td>
</tr>
<tr>
<td>Tur chuni</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Coconut cake</td>
<td>23</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>Wheat bran</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Pellets (commercial pellets for kids)</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Mineral Mixture</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Salt</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
<td><strong>100</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

### Table 2. Average chemical composition of bakery waste and maize grain (%DM)

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Nutrients</th>
<th>Bakery waste</th>
<th>Maize</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dry matter</td>
<td>91.73</td>
<td>90.21</td>
</tr>
<tr>
<td>2</td>
<td>Organic matter</td>
<td>93.76</td>
<td>96.45</td>
</tr>
<tr>
<td>3</td>
<td>Crude Protein</td>
<td>9.89</td>
<td>9.55</td>
</tr>
<tr>
<td>4</td>
<td>Ether Extract</td>
<td>5.22</td>
<td>5.30</td>
</tr>
<tr>
<td>5</td>
<td>Crude Fibre</td>
<td>2.27</td>
<td>1.90</td>
</tr>
<tr>
<td>6</td>
<td>NFE</td>
<td>76.38</td>
<td>79.70</td>
</tr>
<tr>
<td>7</td>
<td>Total Ash</td>
<td>6.24</td>
<td>3.55</td>
</tr>
<tr>
<td>8</td>
<td>AIA</td>
<td>1.12</td>
<td>1.70</td>
</tr>
</tbody>
</table>

### Table 3. Average chemical composition (%DMB) of experimental concentrate mixtures and Para grass

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Nutrient</th>
<th>Concentrate mixture</th>
<th>Para grass</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Control</td>
<td>Group I</td>
</tr>
<tr>
<td>1.</td>
<td>Dry matter</td>
<td>90.87</td>
<td>91.22</td>
</tr>
<tr>
<td>2.</td>
<td>Organic matter</td>
<td>92.9</td>
<td>90.11</td>
</tr>
<tr>
<td>3.</td>
<td>Crude protein</td>
<td>16.64</td>
<td>16.58</td>
</tr>
<tr>
<td>4.</td>
<td>Ether extract</td>
<td>5.5</td>
<td>5.06</td>
</tr>
<tr>
<td>5.</td>
<td>Crude fiber</td>
<td>8.3</td>
<td>8.34</td>
</tr>
<tr>
<td>6.</td>
<td>NFE</td>
<td>62.46</td>
<td>60.13</td>
</tr>
<tr>
<td>7.</td>
<td>Total ash</td>
<td>7.10</td>
<td>9.89</td>
</tr>
<tr>
<td>8.</td>
<td>AIA</td>
<td>2.45</td>
<td>2.21</td>
</tr>
</tbody>
</table>
Table 4. Overall performance of kids from different groups

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Groups</th>
<th>Statistical Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I</td>
<td>II</td>
</tr>
<tr>
<td>Initial average body weight (kg)</td>
<td>7.84</td>
<td>7.83</td>
</tr>
<tr>
<td>Final body weight (kg)</td>
<td>12.71</td>
<td>12.56</td>
</tr>
<tr>
<td>Total gain in weight (kg)</td>
<td>4.87</td>
<td>4.73</td>
</tr>
<tr>
<td>Average body weights (kg)</td>
<td>10.17&lt;sup&gt;a&lt;/sup&gt; ± 0.42</td>
<td>10.08&lt;sup&gt;b&lt;/sup&gt; ± 0.41</td>
</tr>
<tr>
<td>Average weekly gain in weight (g)</td>
<td>374.36 ± 12.31</td>
<td>364.10 ± 10.94</td>
</tr>
<tr>
<td>Average daily gain in weight (g)</td>
<td>53.51</td>
<td>52.00</td>
</tr>
<tr>
<td>Average daily DM intake (g)</td>
<td>356.92&lt;sup&gt;a&lt;/sup&gt; ± 13.43</td>
<td>355.00&lt;sup&gt;a&lt;/sup&gt; ± 13.54</td>
</tr>
<tr>
<td>DM intake (%)</td>
<td>3.45&lt;sup&gt;a&lt;/sup&gt; ± 0.022</td>
<td>3.47&lt;sup&gt;a&lt;/sup&gt; ± 0.034</td>
</tr>
<tr>
<td>DM intake per unit metabolic body size (g)</td>
<td>61.74&lt;sup&gt;a&lt;/sup&gt; ± 0.54</td>
<td>61.88&lt;sup&gt;a&lt;/sup&gt; ± 0.70</td>
</tr>
<tr>
<td>Average daily TDN intake (g)</td>
<td>230.32&lt;sup&gt;a&lt;/sup&gt; ± 8.67</td>
<td>230.21&lt;sup&gt;a&lt;/sup&gt; ± 8.79</td>
</tr>
<tr>
<td>Average daily DCP intake (g)</td>
<td>27.03&lt;sup&gt;a&lt;/sup&gt; ± 1.02</td>
<td>26.99&lt;sup&gt;a&lt;/sup&gt; ± 1.03</td>
</tr>
<tr>
<td>DM required (kg) per kg gain in weight</td>
<td>6.68 ± 0.18</td>
<td>6.82 ± 0.15</td>
</tr>
<tr>
<td>TDN requirement (kg) per kg gain in weight</td>
<td>4.32 ± 0.11</td>
<td>4.42 ± 0.09</td>
</tr>
<tr>
<td>DCP requirement (kg) per kg gain in weight</td>
<td>0.507 ± 0.01</td>
<td>0.519 ± 0.01</td>
</tr>
</tbody>
</table>

**Input output relationship**

<table>
<thead>
<tr>
<th></th>
<th>Cost of concentrate (₽ /kg)</th>
<th>Total expenses (₽ /day)</th>
<th>Total cost for 91 days (₽ )</th>
<th>Total gain in weight (kg) during 91 days</th>
<th>Cost (₽) per kg weight gain</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>17.29</td>
<td>16.46</td>
<td>15.65</td>
<td>-</td>
<td>76.42</td>
</tr>
<tr>
<td></td>
<td>4.09</td>
<td>3.95</td>
<td>3.65</td>
<td>-</td>
<td>75.99</td>
</tr>
<tr>
<td></td>
<td>372.19</td>
<td>359.45</td>
<td>332.15</td>
<td>-</td>
<td>73.81</td>
</tr>
<tr>
<td></td>
<td>4.87</td>
<td>4.73</td>
<td>4.50</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.507 ± 0.01</td>
<td>0.519 ± 0.01</td>
<td>0.523 ± 0.01</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

The means having common superscript in the same row do not differ significantly
NS- Non Significant
*- Significant at 5% level
**- Significant at
Table 5 Average percent digestibility coefficients, TDN and DCP contents for experimental feeds

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Digestibility Coefficients %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Group I</td>
</tr>
<tr>
<td>Dry Matter</td>
<td>65.21</td>
</tr>
<tr>
<td>Organic Matter</td>
<td>67.89</td>
</tr>
<tr>
<td>Crude Protein</td>
<td>64.58</td>
</tr>
<tr>
<td>Ether Extract</td>
<td>64.84</td>
</tr>
<tr>
<td>Crude Fibre</td>
<td>64.53</td>
</tr>
<tr>
<td>Nitrogen Free Extract</td>
<td>68.90</td>
</tr>
<tr>
<td>TDN %</td>
<td>64.60</td>
</tr>
<tr>
<td>DCP %</td>
<td>7.58</td>
</tr>
</tbody>
</table>
Effect on Physiological Parameters on Reversal of á-2 Agonist Using Antagonist in Canines

S. D. Chepte, M. G. Thorat, M.F.M. Siddiqui and S.G. Deshmukh
Department of Veterinary Surgery & Radiology, PGIVAS, Akola

ABSTRACT

The present study was conducted to evaluate reversal effect of xylazine using yohimbine HCL in canines, 36 clinical cases of either sex of dogs presented to the TVCC, PGIVAS, Akola and veterinary dispensaries around the vicinity of Akola city. These dogs were randomly divided into three group’s viz. group I, group II, and group III. Each group again sub divided into A and B i.e. Group IA, Group IB, Group IIA, Group IIB, Group IIIA and Group IIIB. In all groups, subgroup A was considered as control group and subgroup B was considered as treatment group. Physiological parameters viz. rectal temperature, heart rate, respiratory rate were recorded at 0, 5, 10, 15, 20, 30 minutes of interval and after complete recovery. Control group showed significant decrease in heart rate, respiratory depression and rectal temperature, whereas, in treatment groups significant increase in heart rate, respiratory rate and rectal temperature due to administration of yohimbine HCL was noted. Further, it was concluded that yohimbine HCL successfully reversed the impairment produced by xylazine.

Keywords : Xylazine, yohimbine HCL, physiological parameters

INTRODUCTION

Smooth induction and maintenance of general anaesthesia is of great importance to the filed veterinarians as well as for the safety of patient. But certain risks are always associated with the administration of anaesthesia, mainly like overdosing and prolong recumbency. Xylazine is well known sedative analgesic and muscle relaxant which is a á2- adrenoreceptor agonist. Xylazine produce its effect by autonomic and mild central nervous system depression. It causes twitching in deep sedation, vomiting in dogs and excessive sweating in horses. It is also responsible for regurgitation and can cause tympanitis due to prolonged recumbency, pressure damage to nerve and muscle tissue (Hall & Clark, 1991).

MATERIAL AND METHODS

The present study was conducted on 36 clinical cases of either sex of dogs presented to the Teaching Veterinary Clinical Complex, PGIVAS, Akola and veterinary dispensaries in the vicinity of Akola city. These dogs were randomly divided in three groups as followed

Group IA Xylazine @ 1.0 mg/kg b. wt. intramuscularly.
Group IB Xylazine @ 1.0 mg/kg b. wt. intramuscularly and after completion of surgery yohimbine HCL @ 0.1 mg/kg b. wt intravenously for the reversal of effect of Xylazine.
Group IIA Xylazine was administered @ 1.5 mg/kg b. wt. intramuscularly
Group IIB Xylazine was administered @ 1.5 mg/kg b. wt. intramuscularly and after completion of surgery yohimbine HCL @ dose rate 0.1 mg/kg b. wt intravenously for the reversal of effect of Xylazine.
Group IIIA Xylazine was administered @ 2.0 mg/kg b. wt. intramuscularly

Xylazine at higher dose can cause cardiovascular depression which many times proves to be fatal to the patient. Yohimbine hydrochloride is á2- antagonist indole alkaloid that blocks the release of nonadrenaline in the CNS, thereby stopping the action of this neurotransmitter on the central á2-receptor. It is a selective and competitive á-2 adrenergic receptor antagonist. Hence the study was undertaken to evaluate the effect of reversal of á-2 agonist using antagonist in canine.
Group IIIB  Xylazine was administered @ 2.0 mg/b. wt. intramuscularly and after completion of surgery yohimbine HCL @ dose rate 0.1 mg/kg b. wt. intravenously for the reversal of effect of Xylazine.

The effects of these two drugs were evaluated during the study by recording observations at the interval of 0, 5, 10, 15, 20, 30 minutes and after recovery. Statistical data was analysed as per Snedecor and Cochran (1994).

RESULTS AND DISCUSSION

Rectal temperature

Average values for rectal temperature in all dogs of control & treatment groups, recorded at different intervals are presented in Table 1.

The rectal temperature in control group was significantly decreased at 20 to 30 minutes as compared to 0 min value in all control groups. A significant decrease (P<0.01) in rectal temperature was observed at 20-30 min intervals among the groups IA, IIA, and IIIA. It could be due to decreased metabolic rate, muscle relaxation and central nervous system depression. The present findings for decrease in rectal temperature were in accordance with those reported by Kandpal et al. (2005) and Sharma et al. (1983).

Heart rate

Average value of heart rate in control & treatment groups at different interval is depicted in table 2. In group IA Average heart beats / minute ranged between 70.17 ± 1.01 to 80.67 ± 1.23 beats / min with pooled mean of 74.14 ± 1.04 beats/minute, whereas, in group IIA dogs, it ranged between 67.67 ± 0.92 to 79.67 ± 0.76 beats / min with pooled mean of 72.62 ± 0.96 beats / min. In group IIIA dogs, average number of heart rates ranged between 65.67 ± 2.47 to 78.83 ± 2.04 beats / min with pooled mean of 71.29 ± 2.11 beats / min. The bradycardia after xylazine administration was observed due to increased baroreceptor activity, vagal tone and decreased cardiac activity. The significant decrease in the heart rate was also reported by Klide et al. (1975), Peshin et al. (1980), Sharma et al. (1983), Kerr et al. (1972), and Kollias et al. (1993).

A gradual increase in heart rate was observed in groups IB, IIB and IIIB up to 30 min. In group IB dogs, average number of heart rates ranged between 77.83 ± 0.83 to 67.83 ± 0.79 beats / min with pooled mean of 73.98 ± 0.85 beats/min. Whereas, in group IIB dogs, it ranged between 77.17 ± 0.79 to 67.33 ± 0.67 beats/min with pooled mean of 73.36 ± 0.87 beats/min. Average heart beats/minute ranged between 76.33 ± 1.61 to 66.00 ± 0.82 beats / min with pooled mean of 72.48 ± 1.23 beats / minute in group IIIB treated dogs. Similar findings were also reported by Kandpal et al. (2005), Hsu et al. (1985), Gross et al. (1992) and Hsu and Shulaw (1984).

Respiration rate

Average value of respiration rate in control & treatment groups at different interval is shown in table 3. In dogs of group IA, the average respiration rate per minute was ranged between 13.50 ± 0.81 to 23.17 ± 0.48 breaths / min with a pooled mean of 17.60 ± 0.69 breaths / min, whereas, in group IIA, the average respiration rate ranged between 13.50 ± 0.43 to 22.67 ± 0.49 breaths / min with a pooled mean of 17.43 ± 0.59 breaths / min. In group IIIA treated dogs the average respiration values ranged between 11.17 ± 0.40 to 23.00 ± 0.37 breaths / min with a pooled mean of 16.17 ± 0.66 breaths / min. Significant decrease in respiratory rate was observed in group IA, IIA and IIIA from 0 to 30 minutes. The significant (P<0.01), decrease in groups IA, IIA, IIIA could be attributed to direct depressant action of Xylazine on central nervous system.

Similar observations were also observed by Peshin et al. (1980), Kandpal et al. (2005) and Sharma et al. (1983).

In group IB treated dogs the average respiratory values ranged between 21.83 ± 0.54 to 12.33 ± 0.56 breaths / minutes with a pooled mean of 18.11 ± 0.67 breaths / minute. Whereas, in group IIB, the average respiration values ranged between 21.33 ± 0.33 to 11.83±0.54 breaths /minute. In group IIIB dogs, the average respiration rate per minute was ranged between 20.50 ± 0.22 to 12.00 ± 0.68 breaths / minute with a pooled mean of 17.14 ± 0.49 breaths / minute. A significant gradual increase in respiratory rate was observed in groups IB, IIB and IIIB. A significant
gradual increase in respiratory rate was observed in groups IB, IIB and IIIB Similar findings was also observed by Kandpal et al. (2005), Hsu et al. (1983), Hsu and Shulaw (1984), Jessup et al. (1983), Hsu et al. (1987) and Cronin et al. (1983)

CONCLUSION
From the present study, it can be concluded that xylazine induced impairment in physiological parameters could be successfully reversed by intravenous administration of yohimbine hydrochloride in canines.

REFERENCES


Table 1. Mean value (± SE) of Rectal Temperature

<table>
<thead>
<tr>
<th>Time (minute)</th>
<th>Group IA</th>
<th>Group IIA</th>
<th>Group IIIA</th>
<th>Pooled Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>101.58±0.07</td>
<td>101.97±0.21</td>
<td>102.07±0.23</td>
<td>101.87±0.11a</td>
</tr>
<tr>
<td>5</td>
<td>101.43±0.07</td>
<td>101.43±0.07</td>
<td>101.52±0.05</td>
<td>101.46±0.03bc</td>
</tr>
<tr>
<td>10</td>
<td>101.30±0.05</td>
<td>101.30±0.06</td>
<td>101.33±0.04</td>
<td>101.31±0.03c</td>
</tr>
<tr>
<td>15</td>
<td>100.43±0.30</td>
<td>100.60±0.36</td>
<td>100.95±0.23</td>
<td>100.66±0.17d</td>
</tr>
<tr>
<td>20</td>
<td>98.55±0.10</td>
<td>98.63±0.08</td>
<td>98.70±0.05</td>
<td>98.63±0.04a</td>
</tr>
<tr>
<td>30</td>
<td>98.42±0.08</td>
<td>98.33±0.09</td>
<td>98.52±0.05</td>
<td>98.42±0.05a</td>
</tr>
<tr>
<td>AR</td>
<td>101.33±0.08</td>
<td>101.32±0.07</td>
<td>101.50±0.10</td>
<td>101.38±0.05bc</td>
</tr>
<tr>
<td>Pooled Mean</td>
<td>100.44±0.11a</td>
<td>100.51±0.13a</td>
<td>100.65±0.11b</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time (minute)</th>
<th>Group IB</th>
<th>Group IIB</th>
<th>Group IIIB</th>
<th>Pooled Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>101.90±0.15</td>
<td>101.62±0.15</td>
<td>100.90±0.34</td>
<td>101.47±0.16bc</td>
</tr>
<tr>
<td>5</td>
<td>101.52±0.10</td>
<td>101.62±0.17</td>
<td>101.12±0.45</td>
<td>101.42±0.16bc</td>
</tr>
<tr>
<td>10</td>
<td>101.70±0.14</td>
<td>101.78±0.14</td>
<td>101.63±0.17</td>
<td>101.71±0.08ab</td>
</tr>
<tr>
<td>15</td>
<td>101.45±0.08</td>
<td>101.35±0.30</td>
<td>101.93±0.25</td>
<td>101.58±0.14abc</td>
</tr>
<tr>
<td>20</td>
<td>101.67±0.14</td>
<td>100.92±0.37</td>
<td>101.77±0.13</td>
<td>101.45±0.16bc</td>
</tr>
<tr>
<td>30</td>
<td>101.50±0.10</td>
<td>102.15±0.18</td>
<td>101.55±0.07</td>
<td>101.73±0.10ab</td>
</tr>
<tr>
<td>AR</td>
<td>101.65±0.11</td>
<td>101.75±0.21</td>
<td>101.43±0.13</td>
<td>101.61±0.09abc</td>
</tr>
<tr>
<td>Pooled Mean</td>
<td>101.63±0.12a</td>
<td>101.60±0.22a</td>
<td>101.48±0.22a</td>
<td></td>
</tr>
</tbody>
</table>

The mean bearing the same super scripts indicate non-significant difference (P<0.01)
### Table 2. Mean value (± SE) of Heart rate

<table>
<thead>
<tr>
<th>Time (minute)</th>
<th>Group IA</th>
<th>Group IIA</th>
<th>Group IIIA</th>
<th>Pooled Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>80.67±1.23</td>
<td>79.67±0.76</td>
<td>78.83±2.04</td>
<td>79.72±0.80&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>5</td>
<td>78.17±1.08</td>
<td>76.50±0.76</td>
<td>75.83±2.07</td>
<td>76.83±0.81&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>10</td>
<td>75.83±0.95</td>
<td>74.33±1.05</td>
<td>73.33±2.28</td>
<td>74.50±0.88&lt;sup&gt;bcd&lt;/sup&gt;</td>
</tr>
<tr>
<td>15</td>
<td>74.17±0.83</td>
<td>72.33±0.84</td>
<td>70.17±2.51</td>
<td>72.22±0.96&lt;sup&gt;def&lt;/sup&gt;</td>
</tr>
<tr>
<td>20</td>
<td>71.83±1.01</td>
<td>70.00±1.15</td>
<td>68.33±2.40</td>
<td>70.06±0.96&lt;sup&gt;fgh&lt;/sup&gt;</td>
</tr>
<tr>
<td>30</td>
<td>70.17±1.01</td>
<td>67.67±0.92</td>
<td>65.67±2.47</td>
<td>67.83±0.99&lt;sup&gt;hi&lt;/sup&gt;</td>
</tr>
<tr>
<td>AR</td>
<td>68.17±1.17</td>
<td>67.83±1.19</td>
<td>66.83±0.98</td>
<td>67.61±0.62&lt;sup&gt;i&lt;/sup&gt;</td>
</tr>
<tr>
<td>Pooled Mean</td>
<td>74.14±1.04&lt;sup&gt;c&lt;/sup&gt;</td>
<td>72.62±0.96&lt;sup&gt;o&lt;/sup&gt;</td>
<td>71.29±2.11&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time (minute)</th>
<th>Group IB</th>
<th>Group IIB</th>
<th>Group IIIB</th>
<th>Pooled Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>67.83±0.79</td>
<td>67.33±0.67</td>
<td>66.00±0.82</td>
<td>67.06±0.45&lt;sup&gt;i&lt;/sup&gt;</td>
</tr>
<tr>
<td>5</td>
<td>69.83±0.87</td>
<td>69.33±0.92</td>
<td>68.17±0.75</td>
<td>69.11±0.49&lt;sup&gt;ghi&lt;/sup&gt;</td>
</tr>
<tr>
<td>10</td>
<td>72.17±0.87</td>
<td>71.00±1.06</td>
<td>70.50±0.92</td>
<td>71.22±0.55&lt;sup&gt;efg&lt;/sup&gt;</td>
</tr>
<tr>
<td>15</td>
<td>73.67±0.76</td>
<td>73.17±0.91</td>
<td>72.17±1.08</td>
<td>73.00±0.52&lt;sup&gt;cde&lt;/sup&gt;</td>
</tr>
<tr>
<td>20</td>
<td>75.83±0.79</td>
<td>75.50±0.89</td>
<td>75.67±1.71</td>
<td>75.67±0.65&lt;sup&gt;bce&lt;/sup&gt;</td>
</tr>
<tr>
<td>30</td>
<td>77.83±0.83</td>
<td>77.17±0.79</td>
<td>76.33±1.61</td>
<td>77.11±0.64&lt;sup&gt;ab&lt;/sup&gt;</td>
</tr>
<tr>
<td>AR</td>
<td>80.67±1.02</td>
<td>80.00±0.86</td>
<td>78.50±1.71</td>
<td>79.72±0.71&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Pooled Mean</td>
<td>73.98±0.85&lt;sup&gt;a&lt;/sup&gt;</td>
<td>73.36±0.87&lt;sup&gt;b&lt;/sup&gt;</td>
<td>72.48±1.23&lt;sup&gt;b&lt;/sup&gt;</td>
<td></td>
</tr>
</tbody>
</table>

The mean bearing the same super scripts indicate non-significant difference (P<0.01)
Table 3. Mean value (± SE) of Respiration Rate

<table>
<thead>
<tr>
<th>Mean value (± SE) of Respiration rate after administration of Xylazine in dogs</th>
<th>Time (minute)</th>
<th>Group IIA</th>
<th>Group IIIA</th>
<th>Group IIIA</th>
<th>Pooled Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>23.17±0.48</td>
<td>22.67±0.49</td>
<td>23.00±0.37</td>
<td>22.94±0.25&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>20.83±0.60</td>
<td>20.50±0.50</td>
<td>19.83±0.60</td>
<td>20.39±0.32&lt;sup&gt;bc&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>19.33±0.67</td>
<td>18.67±0.71</td>
<td>17.00±0.82</td>
<td>18.33±0.46&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>17.00±0.93</td>
<td>16.83±0.60</td>
<td>14.67±0.88</td>
<td>16.17±0.51&lt;sup&gt;e&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>15.33±0.88</td>
<td>15.50±0.62</td>
<td>12.67±0.71</td>
<td>14.50±0.51&lt;sup&gt;f&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>13.50±0.81</td>
<td>13.50±0.43</td>
<td>11.17±0.40</td>
<td>12.72±0.41&lt;sup&gt;gh&lt;/sup&gt;</td>
</tr>
<tr>
<td>AR</td>
<td>14.00±0.45</td>
<td>14.33±0.76</td>
<td>14.83±0.83</td>
<td>14.39±0.39&lt;sup&gt;f&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Pooled Mean</td>
<td>17.60±0.69&lt;sup&gt;b&lt;/sup&gt;</td>
<td>17.43±0.59&lt;sup&gt;b&lt;/sup&gt;</td>
<td>16.17±0.66&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mean value (± SE) of Respiration rate after administration of Yohimbine in dogs</th>
<th>Time (minute)</th>
<th>Group IIB</th>
<th>Group IIIIB</th>
<th>Group IIIIB</th>
<th>Pooled Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>12.33±0.56</td>
<td>11.83±0.54</td>
<td>12.00±0.68</td>
<td>12.06±0.33&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>14.17±0.83</td>
<td>14.00±0.52</td>
<td>13.83±0.75</td>
<td>14.00±0.39&lt;sup&gt;ge&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>16.50±0.72</td>
<td>16.00±0.58</td>
<td>15.67±0.67</td>
<td>16.06±0.37&lt;sup&gt;e&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>18.17±0.91</td>
<td>18.00±0.37</td>
<td>17.50±0.56</td>
<td>17.89±0.36&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>20.33±0.61</td>
<td>19.67±0.21</td>
<td>19.00±0.37</td>
<td>19.67±0.27&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>21.83±0.54</td>
<td>21.33±0.33</td>
<td>20.50±0.22</td>
<td>21.22±0.25&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>AR</td>
<td>23.50±0.50</td>
<td>23.17±0.40</td>
<td>21.50±0.22</td>
<td>22.72±0.30&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Pooled Mean</td>
<td>18.11±0.67&lt;sup&gt;a&lt;/sup&gt;</td>
<td>17.71±0.42&lt;sup&gt;b&lt;/sup&gt;</td>
<td>17.14±0.49&lt;sup&gt;b&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The mean bearing the same super scripts indicate non-significant difference (P<0.01)
Extent of Knowledge of Buffalo Dairy Entrepreneurs Regarding Scientific Feeding Practices

Sangram Chavan*, D.S. Deshmukh 1 Manish Sawant 2
1 Department of Veterinary & Animal Husbandry Extension, COVAS, Parbhani
2 Department of Veterinary & Animal Husbandry Extension, BVC, Mumbai (M.S.)
*Corresponding author e-mail : drsangram2004@yahoo.co.in

ABSTRACT

Knowledge is the first step in the adoption of any new innovation. In the present study, the knowledge level of the buffalo dairy entrepreneurs was studied during March 2015 in peri-urban areas of three districts of Marathwada region of Maharashtra by selecting 150 buffalo dairy entrepreneurs. The present study revealed that majority of dairy entrepreneurs had medium level of knowledge on different component of scientific feeding practices viz. feeding of minerals and vitamins 89.33%, fodder production 62.67%, balanced diet 68%, green fodder importance 64%, calf feeding management 64%, special feeding for breeding 51.33%, importance of feed ingredient in animal diet 60% while low level knowledge in fodder treatment 89.33%. The overall knowledge levels of the respondents in scientific buffalo feeding practices fall under low, medium and high categories are 15.33%, 67.64% and 17.33% respectively. The knowledge index of different aspect of improved dairy husbandry practices like importance of feed ingredient in animal diet, balanced diet, importance of green fodder, fodder production, fodder treatment, calf feeding management, special feeding for breeding, feeding of minerals and vitamins were 43.34%, 65.16%, 66.47%, 55.76%, 10%, 39.46%, 17.78%, 18.11%, respectively and overall knowledge index was 42.39% which indicated medium knowledge level of dairy entrepreneurs in the study area. Hence there is lot of scope for improvement in feeding practices through increasing the existing level of knowledge, which can be improved through organizing training programmes, demonstrations, Kisan melas, Kisan ghosthies, exposure visits etc. by various government organizations or NGOs.

Keywords: Dairy animals, knowledge, dairy husbandry, scientific practices, dairy entrepreneurs, peri-urban area.

INTRODUCTION

The livestock sector not only has tremendous growth potential but also plays a crucial role in ameliorating plight of the poor farming communities in India as well as in many developing countries since centuries. Also livestock are the best assurance against the vagaries of nature like drought, famine and other natural calamities. Since, agriculture is mostly seasonal, employment throughout the year is not possible but in dairy farming, employment will be generated round the year. India has the largest livestock population in the world which is more than 512.05 million and buffalo contributes 21.23 per cent of the total (19th Livestock Census-2012). Dairy industry has important role in the national economy and socioeconomic development of the country. It helps in supplementing family incomes and generating gainful employment in the rural as well as in peri-urban area. India is the world’s largest milk producer, with 16 per cent of global production; Milk production is growing at a much faster pace compared to many other agricultural commodities and is being increasingly viewed as a source of food and an effective instrument for improving livelihood.

Urbanization is a common phenomenon in today’s world which has changed the face of the cities. The results of population explosion are shrinking the natural resources like land, water, employment generation, potential of agriculture and animal
husbandry sector. On the contrary, globalisation, disinvestment of public sector companies and investment made by foreign investors has led to huge demand of skilled man power in urban area. This situation had forced rural youth to migrate to urban area for employment and resulted in increase in the size of urban area and demand of agriculture and livestock produce like milk, egg, meat etc. Also, employment has improved paying capacity of youth, awareness about nutritional requirements, health etc. For converting this opportunity in income generation, entrepreneurs, school dropouts and unemployed youths have started buffalo dairy farming in peri-urban area.

Though increasing milk production is a combination of good genetics, good management and good feeding, which constitute the major day-to-day expense. A dairy entrepreneur always expects productive and reproductive performance of animals at optimum level for enhancing cost benefit ratio. This can be achieved by scientific feeding practices which help to minimise the cost of production and also to increase milk production. India has emerged as leading milk producer country in the world, however productivity per milking animal is very low. Dairy entrepreneurs have taken up this challenge but the lack of technical information is the major constraints. This low production in India is mainly due to low level of knowledge about improved dairy husbandry practices. In view of fulfilling the demand of dairy entrepreneurs, ICAR institutions, Agricultural Universities, dairy cooperative unions; Veterinary Universities are providing innovative feeding techniques through extension network. By making all kind of efforts; unfortunately the rate of knowledge adoption is very poor. Therefore, keeping in view of the above situation, an effort was made with the objective of ascertaining the knowledge level of Buffalo Dairy Entrepreneurs regarding scientific buffalo feeding practices.

**METHODOLOGY**

The present study was conducted in Beed, Latur and Parbhani district of Maharashtra state in March to April 2015. Three districts were selected randomly from Marathwada region and from each selected district 50 respondents were selected purposively from peri-urban area (15 km away from city). Thus samples comprising total 150 respondents were considered for the study. Dairy entrepreneurs rearing minimum 03 buffaloes from not less than three years were considered for the study. An interview schedule based on the objectives of study was prepared for data collection. Questions on knowledge of different feeding practices of farmer were included in the schedule. For measuring knowledge of the respondent eight feeding practices including 56 items were used. The response was obtained on 2 point continuum viz. know, and don’t know. One score was given to known answer, zero score for don’t know. To measure the knowledge level of farmers, their responses were recorded. Data was tabulated and the total score obtained by individual respondent for all the statements was calculated and analysed. The respondents were categorized as low, medium and high with respect to their knowledge level. Knowledge index was determined by using formula given below:

\[
\text{Knowledge index} = \frac{\text{Actual score obtained}}{\text{Maximum score obtainable}} \times 100
\]

Knowledge level of the respondents was further categorized into low, medium and high for individual feeding practice like importance of feed ingredient in animal diet, balanced diet, importance of green fodder, fodder production, fodder treatment, calf feeding management, special feeding for breeding, use of minerals, vitamins for high milk production.

**RESULTS AND DISCUSSION**

**Importance of feed ingredient in animal diet:**

Data presented in Table 1 indicate that 60.00 per cent of the respondents had medium knowledge followed 20.00 % each by high and low level regarding importance of feed ingredient in animal diet. The present findings are in accordance with the results of Pal (2013) and in contrary to Raval (2011) who observed high knowledge in this aspect (74.00).

**Balanced diet:**

A perusal of the data in Table 1 reveals that majority of the respondents had medium knowledge.
Table 1. Distribution of the buffalo dairy entrepreneurs on the basis of scientific knowledge regarding feeding practices

<table>
<thead>
<tr>
<th>Category</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Importance of feed ingredient in animal diet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low (&lt;2.008)</td>
<td>30</td>
<td>20.00</td>
</tr>
<tr>
<td>Medium (2.008 -8.399)</td>
<td>90</td>
<td>60.00</td>
</tr>
<tr>
<td>High (&gt;8.399)</td>
<td>30</td>
<td>20.00</td>
</tr>
<tr>
<td>Balanced diet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low (&lt;2.870 )</td>
<td>02</td>
<td>1.33</td>
</tr>
<tr>
<td>Medium ( 2.870 – 12.769)</td>
<td>147</td>
<td>98.00</td>
</tr>
<tr>
<td>High (&gt; 12.769 )</td>
<td>01</td>
<td>0.67</td>
</tr>
<tr>
<td>Importance of green fodder</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low (&lt; 3.112 )</td>
<td>36</td>
<td>24.00</td>
</tr>
<tr>
<td>Medium ( 3.112-6.193)</td>
<td>96</td>
<td>64.00</td>
</tr>
<tr>
<td>High (&gt; 6.193 )</td>
<td>18</td>
<td>12.00</td>
</tr>
<tr>
<td>Fodder production</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low (&lt; 0.736)</td>
<td>56</td>
<td>37.33</td>
</tr>
<tr>
<td>Medium (0.736 - 2.610)</td>
<td>94</td>
<td>62.67</td>
</tr>
<tr>
<td>High (&gt; 2.610 )</td>
<td>18</td>
<td>12.00</td>
</tr>
<tr>
<td>Fodder treatment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low (&lt; 0.966 )</td>
<td>134</td>
<td>89.33</td>
</tr>
<tr>
<td>Medium (0.966 – 2.566 )</td>
<td>05</td>
<td>03.33</td>
</tr>
<tr>
<td>High (&gt; 2.566 )</td>
<td>11</td>
<td>07.33</td>
</tr>
<tr>
<td>Calf feeding management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low (&lt; 0.95 )</td>
<td>43</td>
<td>28.67</td>
</tr>
<tr>
<td>Medium (0.95 - 2.995)</td>
<td>96</td>
<td>64.00</td>
</tr>
<tr>
<td>High (&gt; 2.995 )</td>
<td>11</td>
<td>07.33</td>
</tr>
<tr>
<td>Special feeding for breeding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low (&lt; 0. 006 )</td>
<td>72</td>
<td>48.00</td>
</tr>
<tr>
<td>Medium ( 0.006 - 1.0726)</td>
<td>77</td>
<td>51.33</td>
</tr>
<tr>
<td>High (&gt;1.0726 )</td>
<td>01</td>
<td>00.67</td>
</tr>
<tr>
<td>Feeding of minerals and vitamins</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low (&lt; 0.042 )</td>
<td>11</td>
<td>07.33</td>
</tr>
<tr>
<td>Medium (0.042 - 1.751)</td>
<td>134</td>
<td>89.33</td>
</tr>
<tr>
<td>High (&gt; 1.751 )</td>
<td>05</td>
<td>3.333</td>
</tr>
</tbody>
</table>
(98.00%) followed by low knowledge (1.33%) and high knowledge (0.67%) in balance diet aspect which indicate that majority of respondents were having basic knowledge of feeding of balance ration to their buffaloes. The present findings are in accordance with the results of Jaspreet (2005) Sharma (2008) and against findings of Quddus (2012).

**Importance of green fodder:**
Table 1 shows that majority (64.00%) of the respondents had medium knowledge followed by low knowledge (24.00%) and high knowledge (12.00%) regarding importance of green fodder. The present findings are in accordance with results of Gautama (2015).

**Fodder production:**
Table 1 reveals that majority (62.67%) of the respondents had medium knowledge followed high knowledge (37.33%) and low knowledge (37.33%) regarding fodder production. These results are in confirmation with the results of Pal (2013), Sharma (2008) and against with Kanawat (2014).

**Fodder treatment:**
Data presented in Table 1 indicate that 7.33 per cent of the respondents had high knowledge followed by 89.33 per cent having low knowledge and 3.33 per cent having medium knowledge regarding fodder treatment. Insufficient knowledge about these aspects implies that the buffalo owners don’t know the importance of fodder treatment. This misconception among farmers may be removed by the field veterinarians and other extension agencies by organizing farmers training and awareness camps.

**Calf feeding management:**
A perusal of the data in Table 1 reveals that majority of the respondents had medium knowledge (64.00%) followed by low knowledge (28.67%) and high knowledge (7.33%) regarding calf feeding management. It was observed that respondents were unaware about quantity of milk to feed to new-born calves. Also, they were having a misconception that feeding colostrum would cause indigestion to the calf. The present findings are in accordance with the results of Raval (2011), Kanwat (2014).

**Special feeding for breeding:**
Table 1 shows that majority (51.33%) of the respondents had medium knowledge followed by low knowledge (48.00 %) and high knowledge (0.67%) in special feeding for breeding. During data collection, it was observed that respondents mostly feeding the advanced pregnant and parturated animals and stall feeding was used to feed the concentrate by mixing it with chaffed fodder. The present findings are in accordance with results of Meena (2009).

**Feeding of minerals and vitamins for high milk production:**
Data presented in Table 1 reveal that majority (89.33%) of the respondents had medium knowledge followed low knowledge (7.33%) and high knowledge (3.33%) in feeding of minerals and vitamins for high milk production. It was surprised that not a single farmer was having the knowledge about feeding of Bypass protein, Bypass fat, live yeast culture in the study area as they were using mostly mineral mixture.

**Table 2. Distribution of the buffalo dairy entrepreneurs on the basis of overall knowledge regarding scientific feeding practices**

<table>
<thead>
<tr>
<th>Category</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low (&lt; 16.337)</td>
<td>23</td>
<td>15.33</td>
</tr>
<tr>
<td>Medium (16.337 - 31.143)</td>
<td>101</td>
<td>67.64</td>
</tr>
<tr>
<td>High (&gt; 31.143)</td>
<td>26</td>
<td>17.33</td>
</tr>
</tbody>
</table>

**Overall knowledge level:** Overall knowledge level of the respondents in scientific feeding practices is depicted in Table 2. Majority of the dairy entrepreneurs had medium level of knowledge (67.64%) whereas remaining 17.33 and 15.33 per cent respondents had high and low level of knowledge respectively. It can be observed that majority of the respondents had medium knowledge level regarding scientific buffalo feeding practices. The medium knowledge level might be attributed to their exposure to information sources, contact with extension personnel and adequate technical guidance provided by the agencies working for transfer of technology in the study area. Present results are similar to the
findings reported by Sharma (2008). It can be interpreted from Table 2 that there is a scope to convert medium knowledge category to high knowledge category by providing training to entrepreneurs regarding scientific feeding practices.

![Fig.1. Distribution of respondents on basis of overall knowledge level](image)

**Knowledge index:** Data in Table 3 reveals the knowledge index of different aspects of scientific buffalo feeding practices. The maximum extent of knowledge was found in the area of importance of green fodder (66.47%) followed by balanced diet (65.16%), fodder production (55.76%) importance of feed ingredient in animal diet (43.34%), calf feeding management (39.46), feeding of minerals and vitamins for high milk production (18.11%), special feeding for breeding (17.78%) and fodder treatment (10.00%). Overall knowledge level in improved buffalo feeding practices was (42.39%). It clearly indicates that overall knowledge possessed by dairy entrepreneurs is suggestive of a level which is inadequate to carry out dairy farming scientifically. The reason may be the low level of education of the respondents. Poor knowledge about dairy animal husbandry leads to low productivity of animals particularly in the area of feeding, management, ultimately which result into uneconomic dairy farming. In contrary to the present study Meena (1999) observed the maximum extent of knowledge in dairy animal owners of Sawai Madhopur district of Rajasthan in the area of feeding (72.60%) Whereas Kumar (2011) reported feeding knowledge (37.84%) in Banka district of Bihar, Pal (2013) reported fodder production knowledge (35.55%).

![Fig.2 Knowledge indices of scientific buffalo feeding practices](image)

<table>
<thead>
<tr>
<th>Table 3. Knowledge indices of scientific buffalo feeding practices</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Category</strong></td>
</tr>
<tr>
<td>Importance of feed ingredient in animal diet</td>
</tr>
<tr>
<td>Balanced diet</td>
</tr>
<tr>
<td>Importance of green fodder</td>
</tr>
<tr>
<td>Fodder production</td>
</tr>
<tr>
<td>Fodder treatment</td>
</tr>
<tr>
<td>Calf feeding management</td>
</tr>
<tr>
<td>Special feeding for breeding</td>
</tr>
<tr>
<td>Feeding of minerals and vitamins</td>
</tr>
<tr>
<td>Overall Knowledge</td>
</tr>
</tbody>
</table>

**CONCLUSION**

Based on the findings of present study it can be concluded that most of the dairy entrepreneurs had medium level of knowledge regarding scientific buffalo feeding practices. Hence there is lot of scope for improvement in
feeding practices through increasing the existing level of knowledge of dairy entrepreneurs particularly in the areas of feeding which can be improved through organizing awareness campaigns, training programmes, demonstrations, Kisan melas, Kisan ghoshthies, exposure visits etc. by various government organizations or NGOs. There is need to train the dairy entrepreneurs in making low cost balanced ration and preparation of local made mineral mixture from available resources in the area and the scientific techniques for cultivation of green fodder throughout the year by conducting frontline demonstration and on-farm trials to the entrepreneurs. The participatory research should not be ‘scientist led’ but all the stakeholders including farmers should be involved from planning to the stage of interpreting the results. This further will help researchers, technologist, and field workers to identify appropriate technologies relevant for that area.

REFERENCES


Efficacy of Aloe Vera and Citric Acid for the Healing of Chronic Wound in Bovines

Deshmukh R. R., Salunke V. M., Chaudhari K. S., Pitlawar S. S. Somkuwar A. P.,
Moregaonkar S. D. and Sangame A. D.
Department of Surgery and Radiology,
College of Veterinary and Animal Sciences, Udgir, Dist- Latur (MS).

ABSTRACT
The present study was conducted on 40 clinical cases of chronic wounds of bovine, referred to TVCC of College of Veterinary and Animal Sciences, Udgir, Dist - Latur, Maharashtra and nearby Veterinary dispensaries during the study period. These cases were randomly divided into 4 groups of 10 animals in each group. Freshly collected aloe vera pulp and paste of citric acid (3 gm) + aloe vera (100 gm) was applied locally for dressing of chronic wounds in group I and II, respectively. In group III and IV, 5% povidone iodine and citric acid with petroleum jelly, respectively, were applied for the wound dressing. No local or systemic antimicrobials were used in any group during the study period. From this study conclusions could be drawn as slightly more wound contraction was observed in aloe vera + citric acid treated wounds and epithelization and granulation tissue formation was more in cases treated with aloe vera, aloe vera + citric acid and citric acid as compared to povidone iodine treated group.

Key words: Aloe vera, Citric acid, Wound, Bovines.

INTRODUCTION
Most of the antiseptic agents being toxic to cells retard normal healing process. Sometimes, they may permit more virulent organisms to dominate. Further, the systemic antibiotics have also been showed not to reach adequate tissue levels in chronic granulation tissue and have no effect on bacterial level in granulating wound. Thus, it is very difficult to eliminate the infecting organisms from an infected wound, which form dead layer of cells over the wound site and delay the wound healing, leading to chronicity of wound that which does not show tendency to heal and stops healing in chronic wound.

The wound healing properties of Aloe vera and povidone iodine was tested by so many workers and proved good. Citric acid has been reported in the effective management of variety of chronic wounds including burns, ulcers and other chronic wounds caused by E. coli, Pseudomonas aeruginosa and other bacteria (Nagoba et al., 2010a). It also enhances epithelization, which is a major factor in wound healing. Hydration, oxygenation and removal of dead tissue ensures good epithelization. Citric acid keeps wound surface moist and prevents wound desiccation, which retards wound healing; thus, it reduces dehydration necrosis (Nagoba et al., 2010b). Therefore, the present study was undertaken to evaluate and compare the efficacy of aloe vera, aloe vera + citric acid, povidone iodine and citric acid on healing of chronic wound in bovines.

MATERIAL AND METHODS
The study was conducted on 40 clinical cases of chronic wounds of bovine, referred to Teaching Veterinary Clinical Complex of College of Veterinary and Animal Sciences, Udgir, Dist- Latur, Maharashtra and nearby Veterinary dispensaries during the study period. These cases were randomly divided into 4 groups of 10 animals in each group. The wound area was thoroughly prepared before application of aloe vera, aloe vera + citric acid, povidone iodine and citric acid.

Freshly collected aloe vera pulp and paste of citric acid (3 gm) + aloe vera (100 gm) was applied
locally for dressing of chronic wounds in group I and II, respectively. In group III and IV, 5% povidone iodine and citric acid with petroleum jelly, respectively, were applied for the wound dressing. No local or systemic antimicrobials were used in any group during the study period.

RESULTS AND DISCUSSION

Healing of wounds in all the groups was evaluated on the basis of clinical observations, granulation tissue and epithelization, wound contraction and histopathological examination of the wound tissue on 0, 3, 6 and 9th day.

Clinical Observations

In group-I, most of the discolored dead tissue was found abolished by 3rd day and the wound showed healthy, pinkish red, fresh granulation tissue. On 6th day, the wound showed increased vascularisation and regeneration attempt. On 9th day it laid to epithelization (Fig. 1).

In group-II, the healing attempt was seen with replacement / regeneration of fibrous connective tissue rather quickly by 6th day with light yellow colored thick scabs. The serous scabs were following with simultaneous underlying healing in the form of uniform granulation of the gaps. By 9th day, strong epithelization from the borders and distant places in the wound was evident leading to early epithelization (Fig. 2).

In group III and IV, the wounds had blood tinged serous scabs appearing dark brown or blackish which slowly turned into clean yellowish tinged secondary scab formation requiring more time (i.e. 6 days). Thereafter, the replacement was more with connective tissue which would lead to more scar formation; whereas, in group IV the replacement was near normal tissue (fibro-connective muscular tissue) and less scab formation (Fig. 3 and Fig. 4).

Granulation tissue and Epithelization

The study revealed that granulation tissue and epithelization progressed with slight peripheral shrinkage. By the 3rd day onwards the wound edges found merged with granulation tissue and size of
wound was reduced. The granulation tissue and epithelization in group I, II and IV was + (25%) on 3rd day, ++ (50%) on 6th day and +++ (75%) on 9th day. Whereas, in group III, it was + (25%), + (25%) and ++ (50%) on 3rd, 6th and 9th day, respectively, during the study (Table 1). In group I, II and IV there was marked granulation tissue and epithelization as compared to group III. Further, wounds in groups I, II and IV were slightly pinkish at middle part and slightly reddish at edges by 3rd day, while in group III, wounds were slightly pinkish only. However, granulation tissue and epithelization seen by 3rd day onward was accompanied with decreased serous discharge in group I, II and IV.

The property of keeping the wound moist by aloe vera and citric acid might have caused increased granulation tissue in group I, II and IV where aloe vera, aloe vera + citric acid and citric acid were used for the dressing. Davis et al., (1987) also reported similar findings in case of aloe vera, whereas, Nagoba et al., (2010a) and Nagoba et al., (2011) reported similar observations when they used citric acid for the dressing of wounds.

In contrast to this, slightly lesser granulation tissue was observed in group III, which might have been due to dehydrating property of povidone iodine (Salami et al, 2006). Further, the antiseptic property of citric acid due to lowering of pH (Nagoba et al, 2010a) and aloe vera (Davis et al, 1987) would have caused decreased serous discharge from wound treated with aloe vera, aloe vera + citric acid and citric acid in group I, II and IV, respectively.

**Wound contraction**

Mean wound area contraction (%) in group I was 30.548 ± 5.673%, 53.587 ± 4.955 % and 71.661 ± 4.109% on 3rd, 6th and 9th day, respectively, whereas in group II, it was 34.875 ± 4.714 %, 57.755 ± 4.493 % and 75.428 ± 3.035 % on 3rd, 6th and 9th day, respectively. However, in group III the mean wound area contraction was 31.599 ± 2.947 %, 61.184 ± 2.130 % and 71.354 ± 1.838 % and in group IV, it was 32.667 ± 3.238 %, 55.599 ± 4.011 % and 72.908 ± 3.238 % on 3rd, 6th and 9th day, respectively.

**Table 1. Clinical observations of wound healing**

(Type of wound, granulation, epithelialization, serous discharge and coloration)

<table>
<thead>
<tr>
<th>Groups</th>
<th>Type of wound</th>
<th>N</th>
<th>Granulation tissue</th>
<th>Epithelization</th>
<th>Serous discharge</th>
<th>Coloration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>3      6     9</td>
<td>3      6     9</td>
<td>3      6     9</td>
<td></td>
</tr>
<tr>
<td>Group I</td>
<td>Chronic</td>
<td>10</td>
<td>+       ++     +++</td>
<td>+       ++     +++</td>
<td>+       ++     +</td>
<td>Pinkish red</td>
</tr>
<tr>
<td>Group II</td>
<td>Chronic</td>
<td>10</td>
<td>+       ++     +++</td>
<td>+       ++     +++</td>
<td>+       ++     +</td>
<td>Pinkish red</td>
</tr>
<tr>
<td>Group III</td>
<td>Chronic</td>
<td>10</td>
<td>+       ++     ++</td>
<td>+       ++     ++</td>
<td>+       ++     -</td>
<td>Pinkish</td>
</tr>
<tr>
<td>Group IV</td>
<td>Chronic</td>
<td>10</td>
<td>+       ++     +++</td>
<td>+       ++     +++</td>
<td>+       ++     -</td>
<td>Pinkish red</td>
</tr>
</tbody>
</table>

Where, + = Low, ++ = Moderate, +++ = High, and - = Absent. N = Number of cases.
In all the groups significant contraction of wound was noticed from 3rd to 9th day. The increased wound contraction in citric acid treated wounds i.e. group II and IV could be due to antimicrobial property of citric acid (Nagoba et al, 2008: Nagoba et al 2010a and Nagoba et al, 2011).

**Histopathology**

In group I, the microscopic observations of the wound tissue on 3rd day revealed typical inflammatory granulation tissue formation consisting of chronic inflammatory cells (viz. lymphocytes, macrophages and very few neutrophils. On 6th day, the wound gap was not completely filled and at the area of wound there was mesh of fibrous connective tissue, collagen fibers and few erythrocytes. However, epithelization of area was not marked. On 9th day, there was inflammatory granuloma consisting of inflammatory cells (mostly lymphocytes and macrophages), scanty collagen and neovascularisation. However, there was little epithelization. (Fig. 5). In group II, the histopathological study on 3rd day revealed edema, fluid accumulation, plaque formation which contained mainly newly formed collagen and RBCs. The epidermis was distorted and inflammatory plaque was attached at one end, however, little epithelization was noted. On 6th day, there was more marked inflammatory granuloma, collagen formation and scanty epithelization. However, on 9th day collagen formation and epithelial cell proliferation was appreciable and epidermis was not completely restored. The overall histological changes indicated that, there was much more improvement in wound area as there was epithelization at both 6th and 9th day interval of study (Fig. 6).

In group III, on 3rd day, there was large inflammatory plaque consisting inflammatory cells, marked collagen formation and few intact epithelial cells, however, epidermal layer was distorted. On 6th day, there was big inflammatory plaque consisting of fibrin mesh work, marked formation of collagen and little epithelization. On 9th day, there was marked vascularisation, mild to moderate epithelization and collagen formation, which indicated that, the wound healing was mild to moderate (Fig. 7). In group IV, the histological section on 3rd day showed only plaque

---

**Fig. 5: Histological section of wound tissue on 9th day in group I (H&EX200)**

**Fig. 6: Histological section of wound tissue on 9th day in group II (H&EX80)**

**Fig. 7: Histological section of wound tissue on 9th day in group III (H&EX80)**
formation consisting inflammatory granuloma. On 6th day, marked collagen formation and little epithelization was observed. Whereas, the incomplete filling of the gap at the wound area, inflammatory granuloma consisting of marked collagen formation, formation of blood vessels and scanty epithelization was noticed on 9th day (Fig. 8). Gupta and Jain, (2011) who reported increased collagen deposition in betadine treated wounds and Krishnan (2006) who reported higher levels of glycosaminoglycans and proteoglycans on histological examination of granulation tissue of the wound treated with aloe vera. Nagoba et al. (2010a) observed increased vascularity of wound treated with citric acid. Whereas, Nagoba et al. (2008) correlated effect of citric acid on fibroblastic growth and neovascularization which in turn increased microcirculation of wound that enabled formation of healthy granulation tissue.

**REFERENCES**


**CONCLUSIONS**

On the basis of above observations following conclusions could be drawn as slightly more wound contraction was observed in aloe vera + citric acid treated wounds and epithelization and granulation tissue formation was more in cases treated with aloe vera, aloe vera + citric acid and citric acid as compared to povidone iodine treated group.
Histological and Histochemical Study of Corpora Amylacea in Sheep

*Modekar S. S., Dhande, P. L. and *Moregaonkar S. D.

Department of Veterinary Anatomy

Department of Veterinary pathology

Bombay Veterinary College, Parel, Mumbai - 400 012.

*Corresponding author : drshilpa1@rediffmail.com

ABSTRACT

The histological and histochemical study and distribution of Corpora amylacea was done in the mammary gland of Madgyal/ local breed of sheep at different stages of lactation. Corpora amylacea were dense bodies of irregular cauliflower shaped bodies observed in the interlobular, interlobar connective tissue and inter-alveolar connective tissue. The number of Corpora amylacea increased considerably with the advancement of pregnancy. These were more abundant in later stages of lactation and were less in number during the involution and early lactation. Corpora amylacea showed positive reaction for acidic and sulphated mucopolysaccharides. They also showed presence of proteins and mucin.

Key words : Mammary Gland, Small Ruminants, Corpora amylacea, Histology and Histo-chemistry.

INTRODUCTION

The economic importance of the sheep has been recognized by marginal farmers of our country, especially in the hilly tracts and arid zone areas. The birth of lambs of uniform built and motherly instinct to nourish them properly are some of the factors on which the economy of a flock depends. To predict and diagnose mammary aberrations is advance as an economic one of the measure should be known for the normal course of stages of development and measure changes, which differentiates the stages of the gland. Mammary gland is a modified sebaceous gland i.e. cutaneous organ (Sisson 1975) with a wide diversity of physiological and biochemical functions. The mammary gland undergoes lots of change during various stages of the pregnancy and onset of the lactation. The composition and structure of mammary gland depends on the functional state of the gland and it is affected by hormones. The present study had been undertaken in the tissue samples of mammary gland of sheep’s, to study the corpora amylacea in relation to distribution, histological structure and histochemical reactions in lactating and non-lactating stages. As parturition approach there was a rapid development of alveoli and few mitotic figures present in the alveolar epithelium. After parturition, very few isolated mitotic figures were present in the alveolar epithelium which suggested that alveoli development at this time was minimal Anderson (1979) in sheep.

MATERIALS AND METHODS

The present was done on the mammary gland of 30 sheep’s. The mammary gland samples were collected from the Deonar abattoir immediately after slaughter. It was ensured that the samples collected were free from any pathological lesions. The collected samples were categorized into two stages (15 each) as lactating and non-lactating /dry by observing the physiological status of mammary gland and ascertaining the stage of lactation and dry period. The mammary tissue samples of 3-5 mm thickness were collected and fixed in 10% neutral buffered formalin fixative for histological and histochemical studies. After fixation of the tissues for 24-72 hrs. they were subjected to dehydration in the ascending grades of alcohol, cleared in xylene and prepared the paraffin wax blocks as per the method of Drury and Wallington (1980). Then tissue sections of 3-6 µm were cut with the help of spencer rotatory microtome and were mounted on clean albumenized glass slides. These
slides were dried on hot plate at 28-45°C for ½ hr. The prepared sections were stained by Haematoxyline and Eosin, Periodic Acid Schiff’s stain, for PAS positive material and acid mucopolysaccharides respectively as per the method stated by Bancroft and Cook (1994).

RESULT AND DISCUSSION

Corpora amylacea were dense bodies located in the alveoli, interalveolar connective tissue, interlobular and interlobar connective tissue. Similar findings were reported in Murrah buffaloes, by (Chaurasia et al., 2013). Corpora amylacea were seen in their various stages of formation located both in the lumen of alveoli (intra-alveolar bodies) and in septal connective tissue (Interstitial bodies). (Fig. 1). These findings are in accordance with the findings of (Sordillo and Nikerson et al., 1986) who described that Corpora amylacea were most abundant during the later stages of lactation and were least during involution and early stages of lactation in bovine. Similar findings were reported by (Paramsivan et al. 2012) in sheep.

Corpora amylacea varied from round to oval or irregular cauliflower shaped concentrically laminated bodies with hyalinization in the center (Fig. 2). They were desquamated epithelial cells undergoing lysis and accumulated as solid clump-like materials in the lumen of the alveoli. Similar findings were reported by (Naik et al., 2015) in Malnad Gidda Cows. These bodies were either oval or irregularly cauliflower shaped seen in the mammary parenchyma at 90th 120th and 150th day of pregnancy, and these Corpora amylacea went on increasing with the advancement of pregnancy. There increasing number towards the terminal part of pregnancy may be due to involution and rejuvenation of mammary epithelia. Arnold and Weber (1977) stated that it might be due to atrophy of large number of epithelial cells. In non-lactating pregnant animals corpora amylacea were not observed in any stage. This could be attributed to active lobuloalveolar growth of mammary tissue under the influence of ovarian and placental hormones and corpora amylacea were eventually replaced by alveoli in early pregnant stage and with advancement of pregnancy lobulations were established. Similar findings are reported by (Chaurasia et al., 2013) in buffaloes.

In lactating stage, the percentage distribution of corpora amylacea was more in alveoli (Fig. 1). Generally single corpora amylacea was present in alveoli and stroma, occasionally up to four corpora amylacea were seen in the alveoli. Structurally, the corpora amylacea showed homogenous appearance and concentric lamination as well. Corpora bodies showed a degree of staining affinity from light eosionophilic to dark basophilic color by Hematoxiline and Eosin stain.

The corpora amylacea showed positive reaction for acidic and sulphated mucopolysaccharides. The corpora amylacea and blood vessels below the basement membrane which showed positive reaction for mucopolysaccharides. The corpora amylacea showed presence of proteins and mucin by stain. These observations were in agreement with (Naik et al. 2015).

Corpora amylacea varied from round to oval or irregular cauliflower shaped concentrically laminated bodies with hyalinization in the center (Fig. 2). They were desquamated epithelial cells undergoing lysis and accumulated as solid clump-like materials in the lumen of the alveoli. Similar findings were reported by (Naik et al., 2015) in Malnad Gidda Cows. These bodies were either oval or irregularly cauliflower shaped seen in the mammary parenchyma at 90th 120th and 150th day of pregnancy, and these Corpora amylacea went on increasing with the advancement of pregnancy. There increasing number towards the terminal part of pregnancy may be due to involution and rejuvenation of mammary epithelia. Arnold and Weber (1977) stated that it might be due to atrophy of large number of epithelial cells. In non-lactating pregnant animals corpora amylacea were not observed in any stage. This could be attributed to active lobuloalveolar growth of mammary tissue under the influence of ovarian and placental hormones and corpora amylacea were eventually replaced by alveoli in early pregnant stage and with advancement of pregnancy lobulations were established. Similar findings are reported by (Chaurasia et al., 2013) in buffaloes.

In lactating stage, the percentage distribution of corpora amylacea was more in alveoli (Fig. 1). Generally single corpora amylacea was present in alveoli and stroma, occasionally up to four corpora amylacea were seen in the alveoli. Structurally, the corpora amylacea showed homogenous appearance and concentric lamination as well. Corpora bodies showed a degree of staining affinity from light eosionophilic to dark basophilic color by Hematoxiline and Eosin stain.

The corpora amylacea showed positive reaction for acidic and sulphated mucopolysaccharides. The corpora amylacea and blood vessels below the basement membrane which showed positive reaction for mucopolysaccharides. The corpora amylacea showed presence of proteins and mucin by stain. These observations were in agreement with (Naik et al. 2015).

Corpora amylacea varied from round to oval or irregular cauliflower shaped concentrically laminated bodies with hyalinization in the center (Fig. 2). They were desquamated epithelial cells undergoing lysis and accumulated as solid clump-like materials in the lumen of the alveoli. Similar findings were reported by (Naik et al., 2015) in Malnad Gidda Cows. These bodies were either oval or irregularly cauliflower shaped seen in the mammary parenchyma at 90th 120th and 150th day of pregnancy, and these Corpora amylacea went on increasing with the advancement of pregnancy. There increasing number towards the terminal part of pregnancy may be due to involution and rejuvenation of mammary epithelia. Arnold and Weber (1977) stated that it might be due to atrophy of large number of epithelial cells. In non-lactating pregnant animals corpora amylacea were not observed in any stage. This could be attributed to active lobuloalveolar growth of mammary tissue under the influence of ovarian and placental hormones and corpora amylacea were eventually replaced by alveoli in early pregnant stage and with advancement of pregnancy lobulations were established. Similar findings are reported by (Chaurasia et al., 2013) in buffaloes.

In lactating stage, the percentage distribution of corpora amylacea was more in alveoli (Fig. 1). Generally single corpora amylacea was present in alveoli and stroma, occasionally up to four corpora amylacea were seen in the alveoli. Structurally, the corpora amylacea showed homogenous appearance and concentric lamination as well. Corpora bodies showed a degree of staining affinity from light eosionophilic to dark basophilic color by Hematoxiline and Eosin stain.

The corpora amylacea showed positive reaction for acidic and sulphated mucopolysaccharides. The corpora amylacea and blood vessels below the basement membrane which showed positive reaction for mucopolysaccharides. The corpora amylacea showed presence of proteins and mucin by stain. These observations were in agreement with (Naik et al. 2015).

Fig. 1. Photomicrograph of mammary gland showing the apical cell secretion – arrow (SC) and Corpora amylacea (CA) (40X, HE)

Corpora amylacea varied from round to oval or irregular cauliflower shaped concentrically laminated bodies with hyalinization in the center (Fig. 2). They were desquamated epithelial cells undergoing lysis and accumulated as solid clump-like materials in the lumen of the alveoli. Similar findings were reported by (Naik et al., 2015) in Malnad Gidda Cows. These bodies were either oval or irregularly cauliflower shaped seen in the mammary parenchyma at 90th 120th and 150th day of pregnancy, and these Corpora amylacea went on increasing with the advancement of pregnancy. There increasing number towards the terminal part of pregnancy may be due to involution and rejuvenation of mammary epithelia. Arnold and Weber (1977) stated that it might be due to atrophy of large number of epithelial cells. In non-lactating pregnant animals corpora amylacea were not observed in any stage. This could be attributed to active lobuloalveolar growth of mammary tissue under the influence of ovarian and placental hormones and corpora amylacea were eventually replaced by alveoli in early pregnant stage and with advancement of pregnancy lobulations were established. Similar findings are reported by (Chaurasia et al., 2013) in buffaloes.

In lactating stage, the percentage distribution of corpora amylacea was more in alveoli (Fig. 1). Generally single corpora amylacea was present in alveoli and stroma, occasionally up to four corpora amylacea were seen in the alveoli. Structurally, the corpora amylacea showed homogenous appearance and concentric lamination as well. Corpora bodies showed a degree of staining affinity from light eosionophilic to dark basophilic color by Hematoxiline and Eosin stain.

The corpora amylacea showed positive reaction for acidic and sulphated mucopolysaccharides. The corpora amylacea and blood vessels below the basement membrane which showed positive reaction for mucopolysaccharides. The corpora amylacea showed presence of proteins and mucin by stain. These observations were in agreement with (Naik et al. 2015).

Fig. 2. Mammary gland in the dry phase – (CA) Corpora amylacea and decreased diameter of glandular acini. (PAS staining method (pH 2.8) x 400)
REFERENCES


FMD Vaccination Effect on Neat Semen Parameters of Pandharpuri Buffalo Bulls


1Department of Animal Reproduction Gynaecology and Obstetrics,
2Department Veterinary Anatomy & Histology, 3Department of Animal Genetics & Breeding
Bombay Veterinary College, Parel, Mumbai - 400 012.
4Quality control officer, Frozen Semen Laboratory, Kharkee, Pune.
5Primate Biology Laboratory, National Institute for Research in Reproductive Health, Mumbai
*Part of Ph. D Thesis research work - rajshelvet@gmail.com

**ABSTRACT**

The impact of vaccination cannot be ignored as fertility of the bull semen gets compromised and it is one of the major anaphylactic stress factors that affect the semen quality. The present study was designed to evaluate the effect of Foot and Mouth Disease (FMD) vaccination stress on neat semen quality parameters of Pandharpuri buffalo bulls maintained at FSL, Kharkee, Pune during 2016-17. Six Pandharpuri buffalo bulls selected on the basis of those produced freezable quality semen. A total 60 ejaculates were taken before vaccination, which served as control and 60 ejaculates were collected after vaccination at weekly interval to study the effect of vaccination stress. The present study results revealed that FMD vaccination had no significant (P > 0.05) effect on semen volume (4.68 ± 0.17 vs. 4.76 ± 0.14 ml). Whereas mass activity (3.88 ± 0.01 vs. 3.71 ± 0.04) was highly significantly (P < 0.01) affected and progressive motility percentage (77.67 ± 0.35 vs. 74.58 ± 0.99) was significantly (P < 0.05) decreased in vaccinated group. There was significant (P<0.01) decrease in sperm concentration (1298 ± 41.17×10⁶/ml vs. 1086 ± 20.24 ×10⁶/ml) and total sperm output per day (8.66 ± 0.31 vs. 6.62 ± 0.18 ×10⁹) in pre vs. post vaccinated group, respectively. The present study indicates that FMD vaccination adversely affects above parameters of spermiograms for two to three weeks post vaccination in Pandharpuri buffalo bulls. Therefore, the semen collection and preservation should be stopped till the semen parameters are restored to normal values (pre-vaccination) to avoid the vaccination stress.

**Keywords**: FMD vaccine, Neat Semen Parameters, Pandharpuri Buffalo Bull

**INTRODUCTION**

To avoid outbreaks of diseases at frozen semen station and supply of disease free semen in the field is extremely important, therefore routine vaccination as preventive measures against various bacterial and viral diseases were carried out. In a year two times FMD vaccination and one time HS and BQ vaccination leads to semen production loss due to vaccination stress. We are losing semen production after vaccination. The results of vaccination impact on semen quality are conflicting in nature in different breeds of breeding bulls. Semen quality is affected by vaccination (Mathur *et al*., 2003, Bhakat *et al*., 2015) due to increase in body temperature as febrile reaction occurs, there is increase in testicular temperature just after vaccination. It directly affects spermatogenesis process (Venkatareddy *et al*., 1991) through epididymal dysfunction (Anderson, 2001). In the contrary Mangurkar *et al*. (2000), Krishnan *et al*. (2003) did not found adverse effect of vaccination on semen quality parameters. However, there is need to explore these issues more to minimize the stressful conditions to the bulls. But there scanty information about effect of vaccination on semen quality during post vaccination period in indigenous buffalo breeds like Pandharpuri buffalo bulls. Therefore, the present study was designed to assess the effects of vaccination on neat semen parameters at pre and post vaccinated stages.
MATERIAL AND METHODS

The present research was carried out on Six Pandharpuri buffalo breeding bulls maintained at Frozen Semen Laboratory, Kharkee, Pune, Maharashtra, India, under standard managemental practices. All the experimental animals were maintained under identical conditions of housing and feeding management. Andrological examinations of the bulls were conducted before experiment started and selected on the basis of similar andrological and seminal parameters. Semen was collected twice a week and two ejaculation per collection by artificial vagina (AV) technique in the morning. Minimum 30 minute gap was given between two successive ejaculates. Each ejaculate was taken by a period of sexual preparation with at least two false mounts with one-two minute restraint. A total 60 ejaculates (6 Bulls X 10 Ejaculates from each bull at weekly interval) were taken before vaccination, which severed as control and total 60 ejaculates (10 ejaculates from each bull at weekly interval) were collected after vaccination to study the effect of vaccination stress on neat semen parameters of Pandhapuri buffalo bulls. As a prophylactic measures the bulls were vaccinated with FMD vaccine (BioFMD-Oil Trivalent vaccine) (Biovet Pvt Ltd., India) @ 2 ml by deep i/m injection route in month of September 2017.

Quality of the semen was assessed for various semen production parameters namely volume, mass activity, individual motility, concentration and total sperm output on collection day (two ejaculates). The semen was collected in 15 ml graduated sterilized glass conical centrifuge tubes with 0.1 ml accuracy. Mass activity was assessed immediately after the semen collection. Gross swirl rating (GSR) of undiluted semen was performed within one min. of collection. A drop 10 il drops of undiluted semen was placed on a warmed slide placed in stage warmer (37°C) and scored on a scale of 0 - 5 using 10X objective lens on the DIC phase contrast microscope (Nikon Eclipse E600, Tokyo, Japan) with Tokoiheat thermal stage. The manual progressive motility and percentage of motile spermatozoa were determined by placing 6 µl of diluted semen was placed on a warmed glass slide (37°C) and allowed to spread uniformly under the cover slip (18 X 18 mm). Initial progressive motility rating was scored using 200 X magnifications with same phase contrast microscope. Percent progressive motility (0 - 100%) was measured at five representative areas of the slide. The sperm concentration was measured using Accucell bovine photo electric colorimeter (imv Technologies) which has been standardized and validated by hemocytometer described by Paulenz et al. (1995).

The results were analyzed statistically and expressed as the mean ± S.E. Data were analyzed by using paired ‘t’ test of significance (Snedecor and Cochran, 1994) to study the effect of vaccination on the semen quality parameters.

RESULTS AND DISCUSSION

From six Pandharpuri buffalo breeding bulls semen was collected for 10 weeks pre and post FMD vaccination at weekly. Analysis was done and the results were present in Table 1.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Semen Parameters</th>
<th>N</th>
<th>Pre-vaccination Control Group</th>
<th>N</th>
<th>Post FMD Vaccination Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Semen Volume (ml)</td>
<td>60</td>
<td>4.68 ± 0.17</td>
<td>60</td>
<td>4.76 ± 0.14NS</td>
</tr>
<tr>
<td>2</td>
<td>Mass Activity (0 to 5 scale)</td>
<td>60</td>
<td>3.88 ± 0.01</td>
<td>60</td>
<td>3.71 ± 0.04**</td>
</tr>
<tr>
<td>3</td>
<td>Initial Motility (%)</td>
<td>60</td>
<td>77.67 ± 0.35</td>
<td>60</td>
<td>74.58 ± 0.99*</td>
</tr>
<tr>
<td>4</td>
<td>Total Sperm Conc. ( N X10⁶/ ml)</td>
<td>60</td>
<td>1298 ± 41.17</td>
<td>60</td>
<td>1086 ± 20.24**</td>
</tr>
<tr>
<td>5</td>
<td>Total sperm output /day ( N X10⁹)</td>
<td>8.66 ± 0.31</td>
<td>6.62 ± 0.18**</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(N: No of Ejaculates, NS : Values are not significant; *: Values are significantly different at both 5% level and ** : Values are significantly different at both 5% and 1% level of significance, S.E. : Standard Error)
A total 60 ejaculates were analyzed before vaccination and which severed as control and 60 ejaculates were evaluated for influence on quality parameters of semen following FMD vaccination. The means ± S.E. with significance level are shown in the table 1. In general a declining trend in all the neat semen quality parameters was observed after vaccination. The results illustrate that vaccination had no significant (P > 0.05) effect on volume (4.68 ± 0.17 vs. 4.76 ± 0.14 ml) of Pandharpuri bull semen. The present findings are similar to the reports of Murugavel et al. (1997), Mangurkar et al. (2000), Singh et al. (2003), Bhakat et al. (2011) and Bhakat et al. (2015). The major portion of the volume of semen is contributed by the accessory sex glands (Roberts, 1986). The secondary activity of these glands remains unaffected following vaccination (Radhakrishnana et al. (1975). This can be reason for no significant effect on volume of semen after vaccination.

Whereas Mass Activity (3.88 ± 0.01 vs. 3.71 ± 0.04) was highly significant (P < 0.01) and progressive motility percentage (77.67 ± 0.35 vs. 74.58 ± 0.99) was significantly (P < 0.05) decreased in Pandharpuir buffalo bulls after vaccination. The results related to mass activity and individual motility are in agreement with the findings of Venkatareddy et al. (1991), Singh et al. (2003), Bhakat et al. (2011) and Perumal et al (2013). The decrease in sperm motility may be due to the epididymal dysfunctions as there is increase in testicular temperature due to rise in body temperature. The increase in testicular temperature leads to testicular degeneration and results in derangement in spermatogenesis process (Venkatareddy et al., 1991). During the passage through epididymis sperm cell normally develops the capacity for motility, but epididymal dysfunction following vaccination leads to decline in sperm motility. On the contrary Mangurkar et al. (2000) and Kumare (2004) reported there was no significant effect on initial motility between pre and post vaccination group.

There was significant decrease (P<0.01) in sperm concentration (1298 ± 41.17×10⁶/ml vs. 1086 ± 20.24 ×10⁶/ml) in Pandharpuir buffalo bulls following vaccination. Our findings are similar to the earlier reports Murgavel et al., 1997, Mathur et al., 2003; Bhakat et al., 2011 and Bhakat et al.2015. On the contrary, Kammar and Gnagadhar, (1998), Kumare, (2004) reported no adverse effect of vaccination on sperm concentration during post vaccination period. There was also significant decrease (P < 0.01) in total sperm output per day (8.66 ± 0.31 vs. 6.62 ± 0.18 ×10⁹) following vaccination. The decreased sperm concentration may be due to an increase in resorption of abnormal and dead spermatozoa in the epididymal sperm reserves as there is increase in abnormal and dead spermatozoa due adverse effect of increase in testicular temperature followed by testicular degeneration and epididymal dysfunction. The main reason behind this poor quality of semen is due to the vaccine stress, affects the function of the epididymis as the epididymis is an organ of sperm maturity and reservoir. There is subsequent decline in epididymal sperm reserves, thus concentration decreases as the resumption of abnormal sperm increase.

**CONCLUSION**

From the present study, it was concluded that the FMD vaccination had an adverse effect on neat semen parameters like volume, mass activity, individual motility, total concentration and total sperm output on collection day. Therefore, semen collection should be suspended till these semen parameters restored to pre vaccination level to avoid vaccination stress and for quality semen production.

**ACKNOWLEDGEMENT**

The authors are thankful to the CEO, Maharashtra Livestock Development Board (MLDB), Akola and Manager, Frozen Semen Laboratory, Kharkee, Pune, Maharashtra, India for providing the facilities for research work.

**REFERENCES**


Kumer J.S. (2004), Effect of FMD vaccination on post thaw seminal attributes. MVSc Thesis submitted to Dept of ARGO, BVC, MAFSU.


Haemato-Biochemical Studies on Dogs Undergoing Butorphanol-Dexmedetomidine-Propofol Anaesthesia during Various Laparoscopic Sterilization Procedures

Nagpur Veterinary College, MAFSU, Nagpur.
*Corresponding author: ssalvekar@gmail.com

ABSTRACT

Twelve healthy dogs presented to TVCC, Nagpur Veterinary College were equally divided into two groups (I and II) and were subjected to laparoscopic ovariectomy and laparoscopic ovariohysterectomy, respectively. All the dogs were premedicated with butorphanol @ 0.2 mg/kg body weight IV, Dexmedetomidine @ 3 mcg/kg bodyweight IV and anaesthesia was induced with propofol @ 4mg/kg bodyweight IV as single bolus dose injected slowly over a period of 60 seconds. For maintenance of anaesthesia, the surgical groups were further subdivided into two sub-groups A1 and A2 comprising of 3 animals from each group and were subjected to continuous infusion rate of propofol @ 0.2 mg/kg/min and 0.3 mg/kg/min respectively. Hematobiochemical parameters were studied before, during and 24 hours after surgery. Haemoglobin, Total erythrocyte counts, Total leukocyte count and Packed cell volume decreased non-significantly during both surgeries but did not differ significantly within or between the anaesthetic groups A1 and A2. A non-significant neutrophilia with compensatory lymphocytopenia along with non-significant alterations in the counts of eosinophils and monocytes were observed in both surgical groups and was non-significant within or between the anaesthetic groups A1 and A2. Significant increase in glucose levels, whereas a nonsignificant increase in levels of alanine aminotransferase, aspartate aminotransferase and serum alkaline phosphatase however non-significant decrease in serum creatinine was observed in both the surgical as well as in anaesthetic groups.

Keywords: Haemato biochemical study, butorphanol-dexmedetomidine-propofol, laparoscopy.

INTRODUCTION

Sterilization procedures in dogs are probably the most common surgical interventions performed at any pet clinics. In females, spaying before 2.5 years, greatly reduces the risk of mammary tumors, the most malignant tumors in female dogs. Chances of pyometra are nearly zero, which otherwise affects about 23% of intact females with 1% mortality rate. However, if done before 1 year of age, significantly increases the risk of obesity and osteosarcoma especially in larger breeds (Sanborn, 2007).

General anaesthetic as a sole agent for inducing anaesthesia has poor analgesic properties, therefore it is recommended to premedicate with a combination of sedative/analgesic and muscle relaxant (Kurum et al., 2013). Dexmedetomidine, a newer alpha 2 agonist, induces reliable, dose-dependent sedation, analgesia and muscle relaxation in dogs. Butorphanol is an opioid agonist–antagonist with analgesic properties. When alpha-2-agonists and opioids are used together certain effects including analgesia (Grimm et al. 2000) and sedation are enhanced due to synergistic analgesic effects of these two classes of drug.

Propofol is a useful agent for induction as well as maintenance of anesthesia, either by intermittent bolus infusion or continuous intravenous infusion (Tranquilli et al. 2007). The use of a continuous infusion rate (CRI) allows a steady flow, thus eliminating the “peak and valley” effect of giving boluses of drugs at specific intervals and thereby
providing consistent, effective analgesia.

**MATERIAL AND METHODS**

Twelve healthy bitches of 1-7 years of age presented to TVCC, Nagpur Veterinary College for sterilization were selected for the study and randomly divided into two groups of six dogs each: Group I (laparoscopic ovariection) and Group II (laparoscopic ovariohysterectomy). All dogs were premedicated with atropine sulphate at the dose rate of 0.024mg/kg body weight subcutaneously 10 minutes before pre anaesthesia. Intravenous cannula (INTRA CATH) was then fixed in the cephalic vein to secure the intravenous line for administration of premedicants and anesthetics for induction and maintenance of general anaesthesia.

Butorphanol @ 0.2 mg/kg body weight was given intravenously and after a delay of 4 minutes Dexmedetomidine @ 3mcg/kg body weight was administered intravenously. Six minutes post dexmedetomidine injection, general anaesthesia was induced with propofol @ 4mg/kg body weight intravenously, injected slowly over a period of 60 seconds. The depth of anaesthesia was maintained with continuous rate infusion of propofol @ 0.2mg/kg/min (sub-group A1) and 0.3 mg/kg/min (sub-group A2) in equal number of dogs in each groups with infusion pump 5 minutes post induction.

Total 4 ml of blood was collected aseptically from the Cephalic vein of all the dogs of both the groups before, during and after complete recovery (24 hours) from surgical procedure. 2 ml of blood was collected in a sterile vial containing EDTA for haematological evaluation and remaining 2 ml of blood was allowed to clot. The serum from these blood samples were used for estimation of Liver and Kidney Function Tests.

**RESULT & DISCUSSION**

Haemoglobin, total erythrocyte count and packed cell volume decreased during surgery in both groups (I and II) but did not differ significantly within or between the anaesthetic groups A1 and A2. Further, surgical procedures had no significant effect on the level of hemoglobin. All the values returned near to baseline by 24 hours of observation and were within normal physiological limits at all times.

The decrease in hemoglobin during the period of anaesthesia or sedation may also be due to shifting of fluid from extravascular compartment to intravascular compartment in order to maintain normal cardiac output in the animals (Wagner and Hellyer, 1991). Similar decrease in hemoglobin levels have also been reported in dogs undergoing laparoscopic ovariection and laparoscopic assisted ovariohysterectomy (Niranjana et al., 2014) under propofol anaesthesia. Whereas, Dharmaceelan et al. (2000) in their comparative laparoscopic sterilization techniques in dogs observed significant reduction in the red blood cell count during surgery.

Non-significant decrease in haemoglobin, red blood cells packed cell volume was observed in both the anaesthetic group and could be attributed to increased plasma volume during anaesthesia on amount of vasodilatation resulting in vascular pooling or splenic pooling of red blood cells (Steffy et al. 1976).

Non-significant decrease in total leucocyte count was observed in both within or between the anaesthetic groups A1 and A2. Costa et al. (2013) also observed decreased total leucocyte count and were of the opinion that immune system is under elaborate control of the neuroendocrine stress response, which was affected by the anaesthetic plane. Non-significant decrease in TLC was also observed by Suresha et al. (2012) in dogs anaesthetized with propofol (5mg/kg) and attributed it to splenic pooling of blood constituents at maximal depth of anaesthesia or due to blood loss during surgery. The total leucocyte counts showed non-significant increasing trend towards baseline values post surgery and could be due to surgical stress and tissue damage by cauter application during laparoscopic techniques and conventional salpingectomy or due to acute inflammatory changes due to more tissue handling (Niranjana et al., 2014).

A non-significant neutrophilia with compensatory lymphocytopenia along with non-significant alterations in the counts of eosinophils and monocytes were observed in both surgical groups and that CRI dose rate (Group A1 and Group A2) had no significant effect on the trend. Propofol has been found to cause immune suppression by altering interleukin-8 secretion from cells (Galley et al., 1998). Catecholamines and glucocorticoids released during
anaesthesia impairs the immune system. However, Costa et al. (2013) were of the view that these factors did not influence white blood cells counts because propofol provides an enhancement in antioxidant efficacies and promotes lower release of catecholamines.

Suresha et al. (2012) recorded non-significant neutrophilia with lymphopenia at 6 - 48 hours post surgeries in dogs subjected to propofol anaesthesia, whereas, eosinophils, basophils and monocytes presented no significant alteration. Brzeski et al. (2002) observed non significantly increased neutrophils with non-significant alterations in the values of lymphocytes and monocytes upto 48 hours in dogs undergoing laparoscopic surgeries, the neutrophilia was attributed to local inflammation in the wound caused by the trocar introduction. Niranjana et al. (2014) observed significant neutrophilia, lymphocytopenia, eosinopenia with non-significant monocytopenia in dogs resulting due to acute inflammatory changes during laparoscopic ovariohysterectomy. Similarly, Mahalingam et al. (2009) observed significant neutrophilia and comparative lymphopenia in dogs subjected to comparative laparoscopic and conventional sterilizations resulting due to release of endogenous glucocorticoids in response to tissue trauma and inflammation.

Neutrophilia and lymphocytopenia recorded in the current study might be due to the stress caused by

<table>
<thead>
<tr>
<th>Parameter</th>
<th>CRI Dose (mg/kg/min)</th>
<th>Before anaesthesia</th>
<th>During anaesthesia</th>
<th>24 hours post recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hb (gm%)</td>
<td>0.2</td>
<td>12.64±0.54</td>
<td>11.83±0.43</td>
<td>11.89±0.42</td>
</tr>
<tr>
<td></td>
<td>0.3</td>
<td>12.74±0.57</td>
<td>12.31±0.64</td>
<td>12.36±0.55</td>
</tr>
<tr>
<td>TEC million/cmm</td>
<td>0.2</td>
<td>5.81±0.23</td>
<td>5.47±0.20</td>
<td>5.37±0.18</td>
</tr>
<tr>
<td></td>
<td>0.3</td>
<td>6.26±0.33</td>
<td>5.78±0.25</td>
<td>5.81±0.25</td>
</tr>
<tr>
<td>PCV (%)</td>
<td>0.2</td>
<td>36.02±1.79</td>
<td>34.22±1.41</td>
<td>33.86±1.40</td>
</tr>
<tr>
<td></td>
<td>0.3</td>
<td>36.48±1.62</td>
<td>36.17±1.64</td>
<td>36.40±1.58</td>
</tr>
<tr>
<td>TLC (x 10^3 cumm)</td>
<td>0.2</td>
<td>13.4±11.75</td>
<td>12.78±8.91</td>
<td>13.63±10.04</td>
</tr>
<tr>
<td></td>
<td>0.3</td>
<td>12.67±10.99</td>
<td>11.97±6.77</td>
<td>12.01±6.83</td>
</tr>
<tr>
<td>Neutrophils (%)</td>
<td>0.2</td>
<td>69.43±2.49</td>
<td>76.55±2.72</td>
<td>76.85±2.73</td>
</tr>
<tr>
<td></td>
<td>0.3</td>
<td>71.20±3.95</td>
<td>73.82±3.34</td>
<td>71.17±4.58</td>
</tr>
<tr>
<td>Lymphocytes (%)</td>
<td>0.2</td>
<td>22.68±1.54</td>
<td>21.56±1.75</td>
<td>19.45±1.75</td>
</tr>
<tr>
<td></td>
<td>0.3</td>
<td>22.20±2.63</td>
<td>21.77±2.37</td>
<td>23.33±1.62</td>
</tr>
<tr>
<td>Eosinophils (%)</td>
<td>0.2</td>
<td>4.45±0.74</td>
<td>4.48±0.53</td>
<td>4.18±0.47</td>
</tr>
<tr>
<td></td>
<td>0.3</td>
<td>4.99±0.89</td>
<td>3.56±0.67</td>
<td>4.29±0.66</td>
</tr>
<tr>
<td>Monocytes</td>
<td>0.2</td>
<td>4.12±0.49</td>
<td>3.60±0.36</td>
<td>3.70±0.44</td>
</tr>
<tr>
<td></td>
<td>0.3</td>
<td>4.55±0.63</td>
<td>3.53±0.50</td>
<td>4.03±0.80</td>
</tr>
</tbody>
</table>
the preanaesthetic and anaesthetic drugs and subsequent stimulation of adrenal glands and local inflammation at the trocar induced wound. Similar findings have been reported by Ahmad et al. (2011).

A non-significant increase in the ALT values in all the groups was observed during anaesthesia and surgery which returned to near baseline values by 24 hours. All the values remained within the normal physiological limits. Similarly, Thakur (2013) observed non-significant alterations in the ALT values in dogs undergoing laparoscopic assisted ovariohysterectomy and conventional ovariohysterectomy. Bayan (2000) stated that an increased ALT level within normal range indicates the normal functioning of vital organs like liver during propofol anaesthesia. Stedile et al. (2009) opined that the increase in the ALT levels during laparoscopy could be related to a decrease in the portal venous flow since the intra-abdominal pressure increased due to pneumoperitoneum or due to direct compressive effect of pneumoperitoneum on liver.

A non-significant increase in levels of aspartate aminotransferase (AST) were observed during and at 24 hours of observation in all groups. Propofol is quickly metabolized and eliminated in 1-3 hours (Paddleford and Harvey 1999), propofol also has extrahepatic route for metabolism and elimination, the non-significant increase in the AST values could be due to rapid distribution and clearance from both hepatic and extra-hepatic sites. Unaltered levels of AST indicated that propofol had minimum or no effect on the liver and other body tissues. Ranganath and Kumar (2007) recorded significant increase in the mean AST levels in dogs subjected to left flank ovariohysterectomy when compared with laparoscopic ovariohysterectomy till 48 to 72 hours and attributed it to excess muscle trauma. Niranjana et al. (2014) too observed non-significant decreased AST values immediately after laparoscopic ovariohysterectomy. Transitory increase in hepatic and muscular enzymes in laparoscopic procedures have been reported by Stedile et al. (2009).

Glucose levels in all dogs were increased significantly during surgery in both surgical groups, which however did not differ significantly between the anaesthetic groups (A1 and A2). The values returned near to baseline values by 24 hours and were within normal physiological limits at any time interval. Devitt et al. (2005) also observed significantly increased blood glucose concentration at 1, 2, 4 and

<table>
<thead>
<tr>
<th>Parameter</th>
<th>CRI Dose (mg/kg/mim)</th>
<th>Before anaesthesia</th>
<th>During anaesthesia</th>
<th>24 hours post recovery.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALT (IU/L)</td>
<td>0.2</td>
<td>23.66±1.98</td>
<td>31.03±3.61</td>
<td>26.53±2.46</td>
</tr>
<tr>
<td></td>
<td>0.3</td>
<td>17.85±1.31</td>
<td>22.79±2.57</td>
<td>27.78±3.93</td>
</tr>
<tr>
<td>AST (IU/L)</td>
<td>0.2</td>
<td>24.85±2.03</td>
<td>28.39±3.23</td>
<td>27.13±3.13</td>
</tr>
<tr>
<td></td>
<td>0.3</td>
<td>22.09±1.35</td>
<td>25.00±1.53</td>
<td>26.28±1.67</td>
</tr>
<tr>
<td>Glucose (mg/dl)</td>
<td>0.2</td>
<td>81.65±2.99</td>
<td>119.46±5.92</td>
<td>85.70±5.66</td>
</tr>
<tr>
<td></td>
<td>0.3</td>
<td>86.72±6.67</td>
<td>121.14±4.38</td>
<td>87.99±3.60</td>
</tr>
<tr>
<td>Creatinine (mg/dl)</td>
<td>0.2</td>
<td>1.04±0.04</td>
<td>0.96±0.03</td>
<td>0.92±0.03</td>
</tr>
<tr>
<td></td>
<td>0.3</td>
<td>0.94±0.05</td>
<td>0.90±0.05</td>
<td>0.91±0.05</td>
</tr>
<tr>
<td>ALP (IU/L)</td>
<td>0.2</td>
<td>74.90±5.17</td>
<td>73.13±5.76</td>
<td>79.55±6.77</td>
</tr>
<tr>
<td></td>
<td>0.3</td>
<td>84.80±5.60</td>
<td>82.90±4.46</td>
<td>87.90±6.18</td>
</tr>
</tbody>
</table>
6 hours following ovariohysterectomy and at one hour following laparoscopic ovariohysterectomy in bitches. Increased glucose following administration of dexmedetomidine-butorphanol followed by propofol induction and maintenance has been recorded in canine orthopedic patients by Surbhi et al. (2010).

Hyperglycemia observed in the present study can be attributed to decreased membrane transport of glucose, decreased glucose utilization, impaired insulin activity and increased blood concentrations of adrenocortical hormones or hyperglycemic effects of dexmedetomidine resulting in suppression of insulin release, stimulation of glucagon release or both in the alpha and beta cells of the pancreas respectively (Jena et al., 2014). Since, there is decrease in the basal metabolic rate of the animal and muscular activity is negligible, it results in decreased glucose utilization by muscles (Potliya et al., 2015). Plasma glucose elevation as a sign of stress due to surgical manipulations or due to anaesthetic agents, which seems to exert their effect on subcortical pathway, which is responsible for regulation of ACTH and produces stress like condition with increased release of glucocorticoids were observed in all the dogs in the present study and are consistent with the finding Suresha et al. (2012) and Jena et al. (2014).

A non-significant decrease in creatinine levels in all dogs presented during surgeries was observed in both the CRI groups (A1 and A2). Further, choice of surgical procedure had no significant effect on the levels of creatinine. The values showed a return to baseline trend by 24 hours observation period. The creatinine values however remained within normal physiological limits at all time intervals.

Dexmedetomidine preserves blood supply to vital organs like brain, heart, liver and kidney at the expense of organs like skin and pancreas and this distribution is not affected by type of anaesthesia. This effect of dexmedetomidine might have been responsible for adequate renal blood flow and enough glomerular filtration rate to maintain creatinine near the baseline values (Khattri et al., 2014). Similar findings were reported by Niranjana et al. (2014) in dogs immediately after laparoscopic ovariohysterectomy. Whereas, Surbhi et al. (2010) observed non-significant initial increase at 30 mins followed by a non-significant decrease. They attributed initial non-significant increase to muscle damage and amino acid degradation in dogs undergoing medetomidine-butorphanol-propofol anaesthesia. Similar non-significant increase in creatinine values were observed at 6 to 48 hours of observation post surgery in dogs subjected to propofol anaesthesia in dogs by Suresha et al. (2012).

Alkaline phosphatase values in all dogs presented a non-significant increase at 24 hours post surgical observation period in all groups and CRI dose rate (A1 and A2) did not show any significant effect on this increase. Further, choice of surgical procedure had no significant effect on the levels of creatinine. Mean values of alkaline phosphatase were non-significantly higher in laparoscopic laparoscopic ovariohysterectomy (82.13±4.52) when compared with laparoscopic ovariohysterectomy (80.56±4.23) and could be attributed to less tissue injury during handling and cauterization in the later group. Although increased, alkaline phosphatase levels remained within normal physiological limits at all time intervals. Elevation in plasma alkaline phosphatase after laparoscopy can be attributed to tissue injury as a result of ischemia reperfusion induced oxidative stress in the liver and kidney following capnoperitoneum (Tan et al. 2003). Mahalingam et al. (2009) attributed increase in ALP levels to the release of endogenous corticosteroids in response to profound tissue injury and stress during comparative laparoscopic sterilization vs open method sterilization in dogs.

**REFERENCES**


Haemato-Biochemical Studies on Dogs Undergoing Butorphanol-Dexmedetomidine-Propofol Anaesthesia during Various Laparoscopic Sterilization Procedures


Relationship of Testicular Biometry with Body Weight, Scrotal Circumference in Pre and Post Pubertal Osmanabadi Bucks

Department of Animal Reproduction Gynaecology & Obstetrics
Bombay Veterinary College, Parel, (MAFSU) Mumbai - 400 012.
Corresponding Author : drumeshkumbhar@gmail.com
Part of PhD work of Dr U. B. Kumbhar

ABSTRACT

The present study was conducted to find out the relationship between testicular biometry by vernier calliper, age, body weight and scrotal circumference In pre And post pubertal Osmanabadi bucks for selection of bucks for breeding. The study was conducted in eighteen male Osmanabadi bucks (post weaning) from the college Instructional Livestock Farm Complex Goregaon. All the bucks were allowed for grazing daily for about 6-8 hours and provided with clean water adlib. All the bucks were weighed by digital weighing machine in kilogram (kg). Scrotal circumference of experimental bucks were recorded with measuring tape in centimetre. Testicular Biometry of the right and left testicle was done by vernier calliper with digital display. All the observations are recorded on fifteen days interval from weaning i.e 120 ± 10 days onwards for six months.

The body weights of Osmanabadi bucks increased significant from 14.45 ± 0.67 kg at four months to 19.57 ± 0.70 kg at nine and half months of age. There was significant increase in scrotal circumference from 17.22 ± 0.56 cm to 19.03 ± 0.55 cm from fourth to ninth and half months of age. there is significant increases in mean right testicular length, width and thickness from 4.87 ± 0.21, 3.06 ± 0.12, 2.63 ± 0.11 to 5.05 ± 0.27, 3.22 ± 0.12, 2.74 ± 0.12 cm from the age of four months to nine and half months, respectively. While there is increases in mean left testicular length, width and thickness from 5.11 ± 0.18, 3.07 ± 0.14, 2.70 ± 0.12 to 5.43 ± 0.20, 3.10 ± 0.13, 2.79 ± 0.12 cm from the age of four months to nine and half months, respectively. The positive significant correlation value between body weight and scrotal circumference (r = 0.99), right & left vernier calliper testicular length, testicular width, testicular thickness r = 0.93, r =0.99, r = 0.99, r = 1.00, r =0.72, r = 1.00 respectively were found. The significant correlation value between scrotal circumference and vernier calliper right and left testicular length, testicular width, testicular thickness r = 0.93, r =0.98, r = 0.98, r = 0.98, r =0.68, r = 0.99 respectively were found. The observations are significant positive at 5% and 1% level.

The testicular biometry by vernier calliper is a potentially valuable tool in the Breeding Soundness Examination and in measuring testicular biometric parameters on field level. There is positive relationship of testicular biometry by vernier calliper with body weight, scrotal circumference in pre and post pubertal osmanabadi bucks.

Keywords : Vernier calliper, Testicular biometry, Body weight, Scrotal circumference, Osmanabadi bucks
INTRODUCTION

Among small ruminants goat in India there is drastic difference in demand and supply of goat meat, despite regular slaughter of millions every year. Goats are prime important species in the small ruminants and second largest species in livestock category and contribute in the production of milk after cattle and buffaloes. Establishment of measureable criteria for judging breeding soundness and guiding selection of male goats for breeding, have not been fully documented. Breeding soundness examination is a valuable, practical tool for the selection of the best breeding bucks in a flock. For Osmanabadi bucks, information is almost non-existent with regards to the relationships between body conformation, testicular traits and reproductive performance under tropical conditions. Paucity of information or lack of systematic research regarding, when bucks should be used for breeding or an age range within which semen production attributes are optimal, make it difficult to determine the optimum age range for efficient breeding and semen collection.

There is no evidence in literature to suggest that this approach has been used in selecting potential Osmanabadi goat sires for superior breeding. Therefore, the aim of this study was to find out the relationship between testicular biometry by vernier calliper, age, body weight and scrotal circumference In pre And post pubertal Osmanabadi bucks for selection of bucks for breeding.

MATERIAL METHOD

Place of Research work
The present work was undertaken at Instructional Livestock Farm Complex, Bombay Veterinary College, Mumbai, Maharashtra, India. Mumbai is situated 10 meters to 15 meters Altitude above mean sea level and western coast of Maharashtra lies between 18.96° north latitude and 72.82° east longitude. The Climate of Mumbai is a tropical wet and dry climate.

Animal Selection
The present study was conducted in eighteen (18) male Osmanabadi bucks from the Instructional Livestock Farm Complex Goregaon. All the Eighteen male Osmanabadi bucks (post-weaning) were allowed for grazing daily for about 6-8 hours and provided with clean water adlib. Apart from grazing all the bucks were supplemented with concentrate feed at the rate of 100 g per animal up to 5 months of age and thereafter 150 g per animal daily. The animals were maintained under ideal farm conditions of feeding and management. The experimental Eighteen male Osmanabadi bucks were maintained in one experimental group and observations were recorded in pre and post pubertal period.

Body weight
All the animals were weighed by digital weighing machine and the body weights were recorded in kilogram (kg) at fifteen days interval from weaning i.e 120 ± 10 days onwards for six months.

Scrotal circumference
The testicles were pushed firmly down to the bottom of the scrotum by placing thumb and fingers laterally on the side of the neck of scrotum and then pushing ventrally down. The scrotal circumference was measured in centimetres (cm) at the greatest diameter of the scrotum by using cloth measuring tape. The scrotal measurement was repeated three times and the average was recorded on every fifteen days interval from 120 ± 10 days for six months.

Testicular biometry by vernier calliper
For testicular biometry by vernier calliper each buck was restrained by an assistant holding the animal firmly with the two limbs separated such that the testes were freely hanging caudally. The length, width and thickness of testis were measured with the help of the digital vernier calliper on every fifteen days from 120 ± 10 days for next six months. The length, width and thickness of testis were measured at widest point of testicle.

RESULT & DISCUSSION

Body Weight in Osmanabadi Bucks during Pre and Post Pubertal period
The body weights of male bucks increased significantly with advancement of age during post-weaning period from 14.45 ± 0.67 kg at four months to 19.57 ± 0.70kg at nine and half months. The average
body weight of male bucks at different ages recorded in this study were 14.45 ± 0.67, 15.14 ± 0.70, 15.59 ± 0.73, 16.07 ± 0.74, 16.79 ± 0.74, 17.30 ± 0.75, 17.86 ± 0.77, 18.14 ± 0.75, 18.45 ± 0.73, 18.87 ± 0.72, 19.20 ± 0.71, 19.57 ± 0.70 in pre and post pubertal period at age of 4, 4.5, 5, 5.5, 6, 6.5, 7, 7.5, 8, 8.5, 9, 9.5 months of age, respectively (Table 1).

The findings of body weight gain in present study are similar to the findings reported by Mehta et al., (1992). They reported the body weights of Surti and Marwari breeds of goat were 3.94 ± 0.19 and 4.13 ± 0.31; 5.33 ± 0.36 and 5.95 ± 0.42; 7.00 ± 0.41 and 8.0 ± 0.59; 7.70 ± 0.47 and 9.38 ± 0.23; 8.52 ± 0.42 and 10.38 ± 0.42; 9.51 ± 0.42 and 11.31 ± 0.54; 11.25 ± 0.21 and 12.62 ± 0.63; 11.37 ± 0.90 and 12.66 ± 0.51; 12.40 ± 1.10 and 12.87 ± 0.43 and 17.90 ± 1.84 and 17.5 ± 1.42 cm at 1, 2, 3, 4, 5, 6, 7, 8, 9 and 12 months of age respectively. They also observed that Marwari male bucks (2.73 ± 0.22 kg) were heavier than Surti male bucks (2.32 ± 0.12 kg) at birth. Body weight increased linearly from birth to 3 months, thereafter slow growth up to 6 months old. This may be due to a slow adaptation to ruminant digestion in both the breeds. Similarly Das et al., (1995) reported the mean body weight was 1.79 ± 0.05, 8.26 ± 0.25, 11.21 ± 0.28, 13.64 ± 0.33 and 16.30 ± 0.40 kg at birth, 3, 6, 9 and 12 months of age, respectively in Barbari goats reared under intensive management condition.

Higher body weight findings than present research work is reported by Bilaspuri and Singh (1992) who reported that the body weight increased from 9.40 ± 0.50 to 30.1 ± 0.60 kg from 4 to 11 months of age with an average monthly gain of 2.96 kg in Malabari male goat bucks. However, highest gain occurred between 9 to 10 months of age.

McGregor (1980) stated that the reduced growth observed between 90-180 days in Saanen breeds of goats due to combined effect of separation stress and diet change immediately after weaning age.

Body weight gain, Onset of puberty or sexual maturity was regulated by interactions between pituitary gonadotrophins and the gonadal steroid hormone i.e., testosterone. Many factors including species, breed, genetic influence, season and nutrition could affect the body weight gain, initiation of puberty in male goats.

Scrotal Circumference In Male Bucks During Pre and Post Pubertal period

In the present study, there was significant increase in scrotal circumference from 17.22 ± 0.56 cm to 19.03 ± 0.55 cm from fourth to nine and half months of age. The scrotal circumference in present study of male bucks at different ages were recorded as 17.22 ± 0.56, 17.53 ± 0.55, 17.80 ± 0.54, 17.95 ± 0.53, 18.04 ± 0.54, 18.26 ± 0.53, 18.56 ± 0.52, 18.73 ± 0.52, 18.74 ± 0.55, 18.85 ± 0.55, 18.95 ± 0.55, 19.03 ± 0.55 in pre and post pubertal period at age of 4, 4.5, 5, 5.5, 6, 6.5, 7, 7.5, 8, 8.5, 9, 9.5 months of age, respectively (Table 1).

Measurement of scrotal circumference is an indirect measurement of testicular size, volume and onset of active spermatogenesis, hence it would be helpful in the evaluation of bucks for breeding soundness. Scrotal circumference was positively correlated to the body weight and age of the animals.

The findings of scrotal circumference measurement in present study is similar to the findings reported by Bilaspuri and Singh (1992). They revealed that the scrotal circumference was increased from 8.00±0.63 to 19.40±1.30 cm between 4-11 months of age in Malabari male bucks.

The scrotal circumference measurement findings higher than present study was reported by Bongso et al. (1982) reported that the scrotal circumference was 4.9–7.9, 7.1–17.5, 10.5–19.8, 11.9–21.0 and 16.2–22.3 cm at 4.9, 5.9–9.9, 10.0–14.9, 15.0–19.9 and 20.0–24.9 kg body weight, respectively. Increased scrotal circumference was observed from 2 months (4.9 cm) age to 13 months (23.8 cm) age in bucks. They also reported that scrotal circumference was more significantly correlated to body weight in crossbred goats.

Parandekar (1987) observed that the scrotal circumference was 27.75±0.23 cm in Sexual mature Osmanabadi bucks and their crosses while Puranik, (1988) reported average scrotal circumference in Osmanabadi and their crossbred bucks were 26.68±0.54 and 27.25±0.28 cm, respectively which is higher than present research work findings.

The scrotal circumference measurement findings lesser than in present study was reported by Mehta et al. (1992) reported that the biometry of scrotum was closely related to the growth of bucks. The growth of the scrotum was faster in Surti than in Marwari bucks. The scrotal circumference of Surti and Marwari was 6.87±0.35 and 5.68±0.20, 8.32±0.51 and 7.53±0.33,
### Table 1: Pre and post pubertal Observations of Osmanabadi Bucks with Mean and Standard Error values

<table>
<thead>
<tr>
<th>Sr</th>
<th>Parameter / Age in months</th>
<th>Prepubertal Observations</th>
<th>Postpubertal Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>4.5</td>
</tr>
<tr>
<td>1</td>
<td>Body Weight</td>
<td>14.45±0.67</td>
<td>15.14±0.70</td>
</tr>
<tr>
<td>2</td>
<td>Testicular Circumference</td>
<td>17.22±0.56</td>
<td>17.53±0.55</td>
</tr>
<tr>
<td>3</td>
<td>V. C. Right testicle Length</td>
<td>4.87±0.21</td>
<td>4.90±0.21</td>
</tr>
<tr>
<td>4</td>
<td>V. C. Right testicle width</td>
<td>3.06±0.12</td>
<td>3.07±0.12</td>
</tr>
<tr>
<td>5</td>
<td>V. C. Right testicle thickness</td>
<td>2.63±0.11</td>
<td>2.64±0.11</td>
</tr>
<tr>
<td>6</td>
<td>V. C. Left testicle length</td>
<td>5.11±0.18</td>
<td>5.14±0.18</td>
</tr>
<tr>
<td>7</td>
<td>V. C. Left testicle width</td>
<td>3.07±0.14</td>
<td>2.97±0.12</td>
</tr>
<tr>
<td>8</td>
<td>V. C. Left testicle thickness</td>
<td>2.70±0.12</td>
<td>2.71±0.12</td>
</tr>
</tbody>
</table>

### Table 2: Correlation Coefficient (r values)

<table>
<thead>
<tr>
<th></th>
<th>Body Weight</th>
<th>Testicular Circumference</th>
<th>Vernier Calliper Right testicle Length</th>
<th>Vernier Calliper Right testicle width</th>
<th>Vernier Calliper Right testicle thickness</th>
<th>Vernier Calliper Left testicle Length</th>
<th>Vernier Calliper Left testicle width</th>
<th>Vernier Calliper Left testicle thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body Weight</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Testicular Circumference</td>
<td>0.99</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vernier Calliper Right testicle Length</td>
<td>0.93</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vernier Calliper Right testicle width</td>
<td>0.99</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vernier Calliper Right testicle thickness</td>
<td>0.99</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vernier Calliper Left testicle Length</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vernier Calliper Left testicle width</td>
<td>0.72</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vernier Calliper Left testicle thickness</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
10.80±0.96 and 8.17±0.58, 12.45±1.32 and 9.21±1.11
and 15.67±0.93 and 12.0±1.87 cm at 1, 3, 4, 6 and 9
months of age, respectively.

Giri et al. (1994) stated that the average scrotal
circumference was larger in Ganjam bucks
(22.89±0.32 cm) than Black Bengal (21.37±0.21 cm)
bucks, but the difference was non-significant.

Ahmad and Noakes (1996) stated that the scrotal
circumference at sexual maturity was 24.13±0.47 cm
in British breeds of goats. They also reported that
the scrotal circumference was correlated with body weight
and age. Kulkarni, (2003) reported the scrotal
circumference was 11.49±0.65 cm at 4 months of age
with body weight of 8.58±0.48 kg which was
increased to 24.78±0.31 cm at 12 months of age with
body weight of 23.0±0.50 kg.

Testicular biometry with vernier calliper during
Pre and Post Pubertal period

In the present study, there is significant increases
in mean right testicular length, width and thickness
from 4.87 ± 0.21, 3.06 ± 0.12, 2.63 ± 0.11 to 5.05 ±
0.27, 3.22 ± 0.12, 2.74 ± 0.12 cm from the age of
four months to nine and half months, respectively. While there is increases in mean left testicular length,
width and thickness from 5.11 ± 0.18, 3.07 ± 0.14,
2.70 ± 0.12 to 5.43 ± 0.20, 3.10 ± 0.13, 2.79 ± 0.12
cm from the age of four months to nine and half
months, respectively. (Table 1).

Rate of growth of testis was most profound from
third to fourth month of age. During this period the
length and width increased about 12 mm and
circumference about 36 mm. This increase was almost
similar to left and right testis. After this period there
was increase in these parameters but the increment
was less as compared to third and fourth month.
Development of left and right testis was exactly same
that is different than bull (Chandolia et al., 1997), but
similar to Ram (Chandolia et al., 1997 and Andrade
et al., 2014).

The observations in present research work is
comparable to the observations of Kabiraj et al. (2011)
who studied the testicular biometry and its relationship
with body weight and semen output of black Bengal
bucks in Bangladesh. In his study twelve black Bengal
bucks of three different age groups, 0.5 to 1.0 years
(group A), 1.5 to 2.0 years (group B) and 2.5 to 3.0
years (group C) were used. The length in group A, B
and C of the left testis was 6.10 ± 0.13, 7.20 ± 0.31
and 7.85 ± 0.22 cm, and for right testis was 5.85 ±
0.13, 6.90 ± 0.33 and 7.35 ± 0.18 cm, respectively.
The breadth in group A, B and C of the left testis was
3.88 ± 0.24, 4.63 ± 0.31 and 4.85 ± 0.12 cm and in
right testis 3.75 ± 0.10, 4.38 ± 0.24 and 4.68 ± 0.12
cm, respectively.

Similar findings are reported by Koyuncu et al.
(2005) who recorded the testis length in ram from
weaning at the 2 to 6 months of age which was 5.83 ±
0.165 cm.

Testicular measurements were increased with the
advancement of age and body weight. The size and
weight of left testis were higher than that of right testis
at the same age.

CORRELATION

In present study positive and significant
correlations was found between testicular biometry
by vernier calliper, body weight and Scrotal
circumference (Table 2). The significant correlation
value between body weight and scrotal circumference
(r = 0.99), vernier calliper right testicular length
(r = 0.93), vernier calliper right testicular width
(r =0.99), vernier calliper right testicular thickness
(r = 0.99), vernier calliper left testicular length
(r = 1.00), vernier calliper left testicular width
(r =0.72), vernier calliper left testicular thickness
(r = 1.00) were found (Table 2). The observations are
significant positive at 5% and 1% level.

The significant correlation value between scrotal
circumference and vernier calliper right testicular length
(r = 0.93), vernier calliper right testicular width
(r =0.98), vernier calliper right testicular thickness
(r = 0.98), vernier calliper left testicular length
(r = 0.98), vernier calliper left testicular width
(r =0.68), vernier calliper left testicular thickness
(r = 0.99) were found (Table 2). The observations are
significant positive at 5% and 1% level.

Similar finding Ugwu (2009) reported a highly
significant positive relationship between Scrotal
Circumference and testis weight of West African
Dwarf bucks. Testis weight is known to be highly
correlated (r = 0.93) with testicular sperm reserves
and males with larger testes tend to produce more
sperm .

Lesser values are reported by Fourie et al. (2005)
who found positive and significant correlations
between Scrotal Circumference and Body weight \( (r = 0.38) \), Body length \( (r = 0.34) \) and Scrotal Weight \( (r = 0.27) \) in Dorper rams. Adeyinka and Mohammed (2006) reported positive correlations between Testicular Traits and Body weight \( (r = 0.30; r = 0.43) \), Scrotal Circumference \( (r = 0.42; r = 0.52) \), and Body weight and Scrotal Circumference \( (r = 0.93; r = 0.88) \) in young Boer bucks. It follows that a good measurement of scrotal circumference would be a reliable predictor of sperm producing capacity.

From present study it is concluded that the testicular biometry with vernier calliper is a potentially valuable tool in the Breeding Soundness Examination and in measuring testicular biometric parameters on field level. There is positive relationship of testicular biometry by vernier calliper with body weight, scrotal circumference in pre and post pubertal osmanabadi bucks. The present results could assist the development and implementation of selection or culling criteria for breeding Osmanabadi bucks at an early age.

REFERENCES


Parandekar D.R. (1987). Studies on semen characteristics and preservation of semen of


Enhancement of Conception Rate Through Luteotropic Hormones in Non-infectious Repeat Breeding Buffaloes on Field Level

Department of Animal Reproduction Gynaecology & Obstetrics
Bombay Veterinary College, Parel, (MAFSU) Mumbai - 400 012.
* Correspnding Author : drumeshkumbhar@gmail.com
#Part of MVSc work of Dr V. P. Deshpande

ABSTRACT

The present research work was carried out to evaluate efficacy & enhance the conception rate through luteotropic hormones in non-infectious repeat breeding buffaloes on field level. The research was conducted at Department of Animal Reproduction, Gynaecology and Obstetrics, Bombay Veterinary College, Mumbai and buffalo dairy farms of Aarey Colony, Goregaon, Mumbai. Thirty two 6 to 8 years old pluriparous repeat breeding Murrah buffaloes of non-infectious origin were selected on the basis of white side test for the study. The buffaloes were randomly devided into four groups with eight animals in each group. The Group I was treated with Inj. GnRH @ 20 µg while Group II and Group III were treated with Inj. hCG @ 1500 IU and 3000 IU, respectively on day 7 after Artificial Insemination. Group IV was kept as control. The pregnancy was confirmed after 2 months of Artificial Insemination by per rectal examination. In present research work, the conception rates in buffaloes of Group I, II, and III were 50.00% (4/8), 50.00% (4/8) and 62.50% (5/8), respectively. In Group IV none of the eight buffaloes was conceived. The overall conception rate in the present study was 40.67% (13/32). From present research it is concluded that the hormones GnRH and hCG both can be used to treat the repeat breeding buffaloes of non-infectious origin when administered on day 7 after artificial insemination. The efficacy of human chorionic gonadotropin @ 3000 IU is more than that of GnRH @ 20 µg and hCG @ 1500 IU to enhance the conception rate.

Key words : Conception rate, GnRH, hCG, Buffaloes.

INTRODUCTION

Buffalo is considered as black diamond due to its great position among the milch animals. They are triple purpose animals, being suitable for milk, meat and draught. In India, buffalo has eminent position among the milk producing animals. India has 108.7 million buffaloes contributing more than 50% of total milk production in the country (Livestock Census, India, 2012). One of the most important and commonly encountered sub fertile conditions in buffalo which plays a vital role in dairy economics is repeat breeding. Repeat breeding is among reproductive disorders which hinder favourable productivity in buffaloes (Sah and Nako, 2006). A repeat breeder buffalo is an animal which does not conceive with 3 or more than 3 consecutive natural services or artificial inseminations. It exhibits normal signs of estrous every 18-24 days but require more than 3 services to become pregnant (Hafez, 2000). Luteal dysfunction leading to inadequate progesterone production post-breeding could be a cause of embryonic death. It results in fertilization failure and early embryonic mortality (Diskin and Morris, 2008) that ultimately cause repeat breeding. Studies have shown that administration of GnRH, GnRH agonist and hCG after AI can stimulate CL function, increase progesterone, reduce estradiol production with a consecutive positive effect on embryonic survival (Bartolome, 2005). In present study, efficacy of two
luteotropic hormones GnRH and hCG at two different doses in non-infectious repeat breeding buffaloes have been studied at field level.

**MATERIALS AND METHODS**

The present research work was conducted in 6-8 years old, pluriparous 32 Murrah buffaloes with history of repeat breeding syndrome. To identify non infectious repeat breeding buffaloes, total 60 Murrah buffaloes were screened with the white side test and 32 buffaloes showing negative result to white side test were selected for the present study from Aarey colony, Goregaon, Mumbai. The per-rectal examination was performed twice 8 days apart to confirm the cyclicity. The animals were randomly divided into four groups with eight buffaloes in each group. All the animals were inseminated after estrous detection by AM PM rule. The Group I (n=8) buffaloes were injected with Inj. Gynarich (Buserelin acetate) @ 20 µg intramuscularly on day 7 after Artificial Insemination. Group II (n=8) buffaloes were injected Inj. Chorulon (Human Chorionic Gonadotropin) @ 1500 IU intramuscularly on day 7 after Artificial Insemination. Group III (n=8) buffaloes were injected Inj. Chorulon (Human Chorionic Gonadotropin) @ 3000 IU on day 7 after Artificial Insemination while Group IV (n=8) buffaloes were kept untreated after AI . The pregnancy diagnosis was performed by per-rectal examination after 60 day of Artificial Insemination.

**RESULTS AND DISCUSSION**

In present research work, the conception rates in buffaloes of Group I, II, and III were 50.00% (4/8), 50.00% (4/8) and 62.50% (5/8), respectively. In Group IV none of the eight buffaloes was conceived. The overall conception rate in the present study was 40.67% (13/32) (Table 1).

The present finding of Group I is in agreement with Pandey (2016) who reported 51.30% conception rate in Murrah buffaloes when 20 mg GnRH was given on the day of AI. Close findings were reported by Kharche and Shrivastava (2006) who reported 45.00% conception rate when GnRH was given @ 20 mg after AI in repeat breeder cows and also with Rao (2000) who reported 55% conception rate when GnRH was given @ 20 mg on the day of insemination in repeat breeder cows. Hailu et al. (2015) also reported conception rate of 55% when GnRH was given on day 12 after AI in repeat breeding cows. Lower findings were reported by Zain (1996) 40.90% conception rate in repeat breeding buffaloes when GnRH was given on day 6-8.

The findings of Group II are similar to that of Sianangama (1992) who reported 55.00% conception rate in cows when treated with hCG intramuscularly @ 1500 IU on day 14 while 62.00% conception rate was also reported by the same author in cows treated with hCG intramuscularly @ 1500 IU on day 7 which is higher finding than present observations. The present research work findings are slightly higher than Kumar et al. (1994) who reported 46.15% conception rate by using hCG @ 1500 IU in repeat breeding crossbred cows.

The present findings of Group III are in agreement with Pandey (2016) who reported 66.70% conception rate by using hCG @ 3000 IU on the day of AI in Murrah buffaloes. The conception rate achieved with 3000 IU hCG is also in agreement with Sandhu and Singh (1992) who reported 67.20% conception rate using hCG @ 3000 IU intravenously on the day of insemination in repeat breeding crossbred cows.

The present results shows that both GnRH and hCG hormone can be effectively used on day 7 after AI to treat repeat breeding buffaloes of non-infectious origin. It may be due to luteotropic action of GnRH and hCG hormone on CL and thereby preventing early luteolysis. However the difference in the conception rate reported by different researchers could be due to the difference in the species, reproductive status, dose rate or day of treatment.

From present research it is concluded that the hormones GnRH and hCG both can be used to treat the repeat breeding buffaloes of non-infectious origin when administered on day 7 after artificial insemination. The efficacy of human chorionic gonadotropin @ 3000 IU is more than that of GnRH @ 20 µg and hCG @ 1500 IU to enhance the conception rate on field level.

**REFERENCES**


Table 1: conception rate in different groups treated with luteotropic hormones

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Group</th>
<th>Treatment Intramuscularly on day 7 after Artificial Insemination</th>
<th>No. of animals treated</th>
<th>No. of animals conceived</th>
<th>Conception rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>I</td>
<td>Inj. GnRH @ 20 µg</td>
<td>8</td>
<td>4</td>
<td>50.00</td>
</tr>
<tr>
<td>2.</td>
<td>II</td>
<td>Inj. hCG @ 1500 IU</td>
<td>8</td>
<td>4</td>
<td>50.00</td>
</tr>
<tr>
<td>3.</td>
<td>III</td>
<td>Inj. hCG @ 3000 IU</td>
<td>8</td>
<td>5</td>
<td>62.50</td>
</tr>
<tr>
<td>4.</td>
<td>IV</td>
<td>Untreated/control</td>
<td>8</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td><strong>Total/Overall</strong></td>
<td></td>
<td></td>
<td>32</td>
<td>13</td>
<td>40.67 %</td>
</tr>
</tbody>
</table>
Observations on Effect of Therapeutic Management on Left Ventricular Systolic Time Intervals in Dilated Cardiomyopathy of Dog

R. D. Velhankar, D. V. Keskar, R. V. Gaikwad and A. Samad
Department of Clinical Veterinary Medicine, Ethics and Jurisprudence
Bombay Veterinary College, Parel, Mumbai - 400 012.

ABSTRACT
Pre Ejection period (PEP), Left ventricular Ejection Time (LVET), ratio of PEP and LVET and Q wave to Aortic Valve Closure (QAVC) were measured in 23 DCM affected and 11 Healthy control group of dogs. Mean Pre Ejection period (PEP), Left ventricular Ejection Time (LVET), ratio of PEP and LVET and Q wave to Aortic valve closure (QAVC) values (mean ± SE) in the control group were 53.91±3.91 msec, 160.55 ± 10.14 msec, 0.34 ± 0.02 and 214.45 ± 12.90 msec respectively, while the same parameters in DCM group measured (mean ± SE) as 77.1± 4.39 msec, 172±5.42 msec, 0.50±0.03 and 249.0±7.63 msec respectively. The observed values of PEP, PEP: LVET ratio and QAVC in DCM group, were significantly higher (P d” 0.05) while LVET values were higher by a non significant margin (P e” 0.05) (NS) than those observed in control group. In the present study, after 30 days of therapy with Digoxin, the PEP significantly decreased (P d” 0.05) (44.55%) as against a modest rise (NS) in LVET values (5.19%) indicative of improvement in left ventricular systolic performance. It was observed that, in control group, PEP and PEP: LVET ratio correlated negatively with Body Weight as against a positive correlation of LVET and QAVC. While in DCM group, PEP, LVET and QAVC correlated negatively and PEP: LVET ratio correlated positively with Body Weight.

Keywords: Left ventricular systolic time intervals, Pre Ejection period (PEP), Left ventricular Ejection Time (LVET) and Q wave to Aortic Valve Closure (QAVC), Digoxin.

INTRODUCTION
Recording of systolic time intervals previously involved simultaneous measurements of ECG, phonocardiogram, and carotid pulse (in human). Now a day, it is a simple technique requiring simultaneous recording of ECG along with M-Mode echocardiogram of aortic valve.

Three basic measurements are made and include Pre Ejection Period (PEP) is the time duration of ventricular depolarization till the opening of aortic valves. Thus, this time duration includes the electromechanical delay and time taken by left ventricles to mount the pressure gradient.

Equivalent to aortic diastole (isovolumic contraction time). Left Ventricular Ejection Time (LVET) is the time duration from opening to the closure of aortic valves. It measures the amount of blood flow during ejection (stroke volume). Total electromechanical systole comprises time from beginning of left ventricular depolarization till closure of aortic valves and designated QAVC (Q point to Aortic Valve Closure). It is the sum of PEP and LVET (Nyland and Mattoon, 1995). Systolic time intervals provide a non-invasive indication of global left ventricular performance which were relatively sensitive and could be easily obtained from M-Mode echocardiogram. As these parameters, according to Nyland and Mattoon (1995), are affected by a number of factors like myocardial contractility, heart rate, loading conditions- they cannot be treated as specific indicator of myocardial contractility but are a non specific indicator of global left ventricular performance.
MATERIALS AND METHODS

This study was conducted at Chandrika Chimanlal Doshi Cardiovascular Unit for Animals, Department of Medicine, and Teaching Veterinary Clinical Complex (TVCC), Bombay Veterinary College, Parel. The dogs, without any age, breed or sex prejudice, presented at TVCC for various ailments, were screened and those with the symptoms of weakness, lethargy, respiratory distress, exercise intolerance, coughing were subjected to thorough clinical examination as per Fox et al. (1988), Ettinger and Feldman (2005) and Tilley et al. (2008). It comprised of careful cardiac auscultation for its rate, rhythm while murmurs were graded as per Ettinger and Suter (1970). Auscultation of lungs yielded severity of congestion and bronchial sounds. Pulse was noted for its rate, regularity, amplitude and deficit-if any. Systolic blood pressure was recorded with the help of “Vet Dop” by Doppler method and Arterial oxygen saturation of hemoglobin (SpO2) was recorded by using a fingertip pulse oximeter. Dorso-ventral and lateral thoracic radiographs of these dogs were taken and cardiac index was calculated as per Hamlin (1968) using DV view, while lateral view was used to calculate vertebral heart size as per Buchanan and Bucheler (1995). Electrocardiogram of these dogs was recorded as per the method recommended by Tilley (1992) and lead II @ 50 mm / sec speed was used for measuring and calculating the various parameters. The dogs showing radiographic and electrocardiographic evidence of cardiomegaly – were further subjected to M-Mode Echocardiographic examination for confirmation of cardiac enlargement as per the method described by Fox et al. (1988), Nyland and Mattoon (1995) and Tilley et al. (2008).

Left ventricular systolic time intervals were calculated using right parasternal short axis view at the level of aorta and these were measured using the inbuilt electronic callipers. A simultaneous ECG was recorded using in built ECG trigger while performing M mode echocardiogram to serve as marker or a guide to correlate the events with the cardiac cycle. The PEP interval was measured from beginning of ventricular depolarization to the beginning of left ventricular ejection (opening of aortic valves) i.e. QRS width and LVET was measured from opening to closure of aortic valves (i.e. S wave to the end of T wave) (Figure 2).

During the period of study, adapting to the above mentioned protocol and using these diagnostic modalities, 23 dogs were detected and confirmed to suffer from DCM and constituted “DCM group”. These DCM (dilated cardiomyopathy) cases were prescribed a therapy based on the recommendations by Tilley and Smith Jr., (2000) and Atkins (2007). It comprised of a positive inotropic agent-Digoxin @ 0.01 mg/kg BID, an ACE inhibitor- Enalapril @ 0.5 mg/Kg B.Wt. OD, loop diuretic- Furosemide @ 2-4 mg/Kg BID, orally / IM / IV, depending on severity of pulmonary congestion/ pulmonary oedema along with Spironolactone - an aldosterone antagonist @ 2 mg/Kg orally BID (0.5-2.5 mg/kg BWt) and L-carnitine, as suggested by Sarita Devi and Jani (2009) @ 50 mg/Kg BID. Since plasma taurine concentration in all the animals in DCM group was precisely within normal range, it was not incorporated in treatment regimen.

These treatment cases were followed up at the TVCC, Parel and advised to report for re-evaluation after a period of one month (30 days) by subjecting to the same tests to assess the treatment response in terms of clinical recovery and cardiac performance. However, due to severity of disease, out of 23 DCM cases, 12 cases died (Died group of dogs) and only 11 dogs survived (Survived group of dogs). These 11 dogs reported after a period of one month for re-evaluation and underwent same set of tests described earlier. This group of 11 survived dogs after post therapeutic assessment formed the “After treatment group” (AT Group). The “Healthy Control Group”- herein after referred to as “Control group” - comprised another 11 apparently healthy dogs of any age, breed or sex – without any complaint of weakness, lethargy, exercise intolerance, respiratory distress or coughing – with their owners’ voluntary participation in this study, were selected and underwent all these tests referred to at above and served as Healthy Control Group.

RESULTS AND DISCUSSION

Left Ventricular Systolic time intervals :

Pre Ejection period (PEP), Left ventricular Ejection Time (LVET), ratio of PEP and LVET and Q wave to Aortic Valve Closure (QAVC) : The mean Pre Ejection period (PEP), Left ventricular
Ejection Time (LVET), ratio of PEP and LVET and Q wave to Aortic valve closure (QAVC) values (mean ± SE) in the control group were 53.91±3.91 msec, 160.55 ± 10.14 msec, 0.34 ± 0.02 and 214.45 ± 12.90 msec respectively (Table 1) while the values of same parameters in DCM group measured (mean ± SE) as 77.1±4.39 msec, 172±5.42 msec, 0.50±0.03 and 249.0±7.63 msec respectively (Table 1) (Figure 1).

The observed values of PEP, LVET, PEP:LVET ratio and QAVC in control group, were in complete agreement with Atkins and Synders (1992), who reported the values for these parameters as 54±7 msec, 159 ± 15 msec, 0.34 ± 0.05 and 214 ± 18 msec respectively. While Pipers et al. (1978) quoted little higher values of these parameters as PEP 69±8 msec, LVET 256 ± 13 msec, PEP:LVET 0.24 ± 0.09 and QAVC 324 ± 7 msec respectively. Hatzade (2011) reported these values (mean ± S.E.), for healthy Labrador males as PEP 57.20 ± 3.20 msec, LVET 161.20 ± 10.33 msec, PEP:LVET ratio 0.36 ± 0.02 and QAVC was 218.40 ± 13.19 msec. In case of the females these values were PEP 51.43 ± 1.66 msec, LVET 158.29 ± 9.25 msec, PEP:LVET ratio 0.33 ± 0.02 and QAVC 209.71 ± 9.71 msec respectively. The probable cause for this variation could be the difference of breeds or age groups or sample size in these studies.

The observed values of PEP, PEP : LVET ratio and QAVC in DCM group were significantly higher (P d” 0.05) than those observed in control group while LVET values, though higher than the control group- did not differ significantly (P e” 0.05) (NS) with control group values (Table 1) (Figure 1). Prolongation of PEP and shortening of LVET – according to Nyland and Mattoon (1995) was an indicator of left ventricular systolic dysfunction. In the present study, the PEP significantly increased as against a modest rise (non significant difference) in LVET values between control and DCM group. Thus, it could be inferred that dogs in DCM group were suffering from left ventricular systolic dysfunction.

As these parameters are influenced by heart rate, myocardial contractility and loading conditions- these, according to Nyland and Mattoon (1995), cannot be considered as specific indicators of myocardial contractility but a non specific indicator of global LV systolic performance.

PEP : LVET ratio and QAVC values PEP : LVET ratio and QAVC values were significantly higher (P d” 0.05) in DCM group as compared with control group (Table 1) and the values reported by Atkins and Synders (1992). Dukes-McEwan et al. (2003), Israel (2003) and Tilley et al. (2008) reported the normal PEP : LVET ratio < 0.4 sec and higher values indicated compromised myocardial contractility. The elevated values of PEP : LVET ratio in the DCM group (0.50 ± 0.03 msec) indicated DCM and this observation is

Method of calculating Left Ventricular Systolic Intervals

Fig. 1 : Histogram Showing Comparison between Control group and DCM Group and Effect of therapy (Survived Group and AT Group)

Fig. 2 : Showing measurements of left ventricular systolic intervals using right parasternal short axis view at the level of aorta
Table 1. Range and Mean ± SE of Systolic Time Intervals in Control and DCM groups using student “t” test

<table>
<thead>
<tr>
<th>Sr No.</th>
<th>Parameters</th>
<th>Unit</th>
<th>Control Group</th>
<th>DCM Group</th>
<th>“t” Calculated</th>
<th>D.F.</th>
<th>Correlation with BWt</th>
<th>Correlation with BWt</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Range</td>
<td>Mean± SE</td>
<td>Range</td>
<td>Mean± SE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>PEP</td>
<td>msec</td>
<td>38-86</td>
<td>53.91 ± 3.91</td>
<td>38-114</td>
<td>77.1 ± 4.39</td>
<td>3.335 *</td>
<td>31 -0.45</td>
</tr>
<tr>
<td>2</td>
<td>LVET</td>
<td>msec</td>
<td>95-210</td>
<td>160.55 ± 10.14</td>
<td>124-211</td>
<td>172 ± 5.42</td>
<td>1.077NS</td>
<td>31 0.21</td>
</tr>
<tr>
<td>3</td>
<td>PEP:LVET</td>
<td>--</td>
<td>0.251-0.450</td>
<td>0.34 ± 0.02</td>
<td>0.330-0.850</td>
<td>0.50 ± 0.03</td>
<td>2.654 *</td>
<td>31 -0.73</td>
</tr>
<tr>
<td>4</td>
<td>QAVC</td>
<td>msec</td>
<td>133-277</td>
<td>214.45 ±12.90</td>
<td>191-300</td>
<td>249 ± 7.63</td>
<td>2.418 *</td>
<td>31 0.03</td>
</tr>
</tbody>
</table>

“t” Critical/Table value at 5% = 2.040
* Significant at P < 0.05, NS - non significant (P > 0.05)  BWt – Body Weight
N.B. Degrees of freedom could change due to non-availability of some observations in two groups.

Table 2. Range and Mean ± SE of Systolic Time intervals in Survived group (Pre Treatment) and After Treatment (AT) group using Paired “t” test

<table>
<thead>
<tr>
<th>Sr No.</th>
<th>Parameters</th>
<th>Unit</th>
<th>Survived Group</th>
<th>AT Group</th>
<th>“t” Calculated</th>
<th>D.F</th>
<th>% change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Range</td>
<td>Mean± SE</td>
<td>Range</td>
<td>Mean± SE</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>PEP</td>
<td>msec</td>
<td>38-98</td>
<td>77.73 ±5.53</td>
<td>29-57</td>
<td>43.1 ±3.27</td>
<td>6.048*</td>
</tr>
<tr>
<td>2</td>
<td>LVET</td>
<td>msec</td>
<td>124-211</td>
<td>174.45 ±8.98</td>
<td>153-210</td>
<td>183.5 ±4.91</td>
<td>0.424NS</td>
</tr>
<tr>
<td>3</td>
<td>PEP / LVET</td>
<td>--</td>
<td>0.23-0.61</td>
<td>0.45 ± 0.03</td>
<td>0.15 -0.35</td>
<td>0.24± 0.02</td>
<td>6.133*</td>
</tr>
<tr>
<td>4</td>
<td>QAVC</td>
<td>msec</td>
<td>191-300</td>
<td>252.18 ±11.62</td>
<td>210-239</td>
<td>226.6±3.25</td>
<td>2.574*</td>
</tr>
</tbody>
</table>

“t”, Critical/Table value at 5% level = 2.262
N.B : Degrees of freedom could change due to non availability of some observations.
* significant (P < 0.05), NS –Non significant (P > 0.05).
in agreement with Dukes-McEwan et al. (2003) who proposed this parameter as a minor criterion for diagnosis of canine dilated cardiomyopathy. A correlation between these parameters and body weight (BWt) was calculated. It was found that, in control group, PEP and PEP: LVET ratio correlated negatively with BWt as against a positive correlation of LVET and QAVC with it (Table 1). These observations are in partial agreement with Boon (2002) who reported a negative correlation of PEP, LVET and PEP:LVET ratio with BWt. The likely reason for this variation could be the breed difference, age and sample size. While in DCM group, PEP, LVET and QAVC correlated negatively and PEP: LVET ratio correlated positively with Body Weight (Table 1). The relevant similar data in dilated cardiomyopathy affected dogs was not available for comparison in the literature referred.

Effect of therapeutic management on Left Ventricular Systolic time intervals:

The average values of (mean ± SE) Pre Ejection period (PEP), Left ventricular Ejection Time (LVET), ratio of PEP and LVET and Q wave to Aortic Valve Closure (QAVC) in Survived group were 77.73 ± 5.53 msec, 174.45 ± 8.98 msec, 0.45 ± 0.03 and 252.18 ± 11.62 msec respectively (Table 2) (Figure 1). While their corresponding mean values (mean ± SE) in After Treatment (AT) group were 43.1 ± 3.27msec, 183.5 ± 4.91 msec, 0.24 ± 0.02 and 226.6 ± 3.25 msec (Table 2). The values of these parameters in the present study in Survived and AT groups were higher than the normal values for dogs reported by Pipers et al. (1978), Atkins and Synders (1992) and Hatzade (2011). The statistical comparison of the data of these parameters revealed that there was a significant decrease of 34.8 mec (P d” 0.05) in the mean PEP and a non-significant increase (P e” 0.05) by 4.0 msec in the mean LVET in AT group as against the Survived group during this treatment period (Table 2) (Figure 1). On percentile basis, PEP decrease was 44.55 % while LVET increase in AT group was by 5.19 %. Nyland and Mattoon (1995) considered decrease in PEP and increased LVET as a sign of improvement of left ventricular systolic performance. The observations in the present study on PEP and LVET corroborate with the opinion of these authors and indicated that the treatment for 30 days could effectively improve PEP and LVET values and improved left ventricular systolic performance that was also confirmed by M Mode echocardiography (EF % and FS%) and clinical improvement in symptoms and general activity. However, post therapeutic rate of recovery of left ventricular systolic time intervals (PEP and LVET) could not be compared with the analogous data owing to its unavailability in the referred literature.

REFERENCES


Observations on Effect of Therapeutic Management on Left Ventricular Systolic Time Intervals in Dilated Cardiomyopathy of Dog


Surgical Management of Acquired Cleft Palate in a Persian Cat

Department of Veterinary Surgery and Radiology, Bombay Veterinary College, Parel, Mumbai - 400 012.
*Corresponding Author: draniladatir@gmail.com

Cleft palate is usually an inherited congenital disorder. It’s more likely to occur in purebred cats and is commonly found in Siamese, Persian and Savannah breeds. Exposure of a pregnant cat to certain chemicals, cortisone, medications, or excessive intake of vitamins A and D has also been linked to the development of cleft palate in embryos. Accidents or falling from a height may turn into cleft palate at any age. Cleft palate interferes with eating and drinking ability of the cat and allows fluid to enter the nasal cavity and many times it leads to death by choking or aspiration pneumonia. When fluid and food enter the nasal cavity, a foreign body rhinitis results and sneezing, gagging and retching during feeding occur (Jaun, 2006).

CASE STUDY

A 2 year old Persian tom cat was presented to BSDP Hospital for Animals, affiliated to Bombay Veterinary College, Mumbai with a history of falling from the 3rd floor of a building. After the accident, epistaxis and milky nasal discharge after eating was noted. On careful observation of oral cavity the cat was diagnosed as traumatic cleft palate. A physical examination revealed normal heart and respiration rates, pink mucus membranes, and a slightly elevated temperature (102.5°F). Assessment of complete blood count, serum biochemistry, urine analysis, skull and thoracic radiographs was done. All the physiological parameters were within normal range and radiographs were normal. The cat was kept fasting for 12 h and then pre-medicated with Triflupromazine HCl @ 3 mg/kg body weight IM and induced with Ketamine HCl @ 30 mg/kg body weight IM. The cat was intubated and maintained on Isoflurane-Oxygen mixture. The cat was positioned in dorsal recumbency and gauze was placed surrounding the endotracheal tube to block entry of fluid in the oropharynx and airway (Fig. 1).

Two edges of soft palate were debrided and undermined in order to close the gap with minimal tension. The mucosal flaps were sutured with an absorbable suture material Vicryl 3-0 (Polyglactin-910 undyed and braided) starting with a buried knot at the caudal end of the cleft followed by a simple continuous suture pattern inside and parallel to palatine ridges towards the rostral end of the cleft (Fig. 2) and ending with an Aberdeen knot in order to provide minimal suture irritation (Fig. 3). The cleft was totally reduced with mucosal fold.

The cat was kept nil by mouth for 3 days postsurgery in order to allow the wound to heal and also to avoid food accumulating and contaminating the surgical site. After 4th day post-surgery the cat was fed soft food then slowly shifted to its normal diet. An Elizabethan collar was applied in order to reduce the chances of the cat damaging the area by head rubbing. Nutrition of cat maintained parentally with Ringer’s lactate, Dextrose 25%, Dextrose 5%, DNS, Normal Saline. Post-operatively the cat was treated with an antibiotic Cefotaxime Sodium @ 25 mg/kg BW IV BID for 5 days, Meloxicam @ 0.2 mg/kg BW.
SC followed by @ 0.1 mg/kg BW SC for 3 days. Sutures were removed after the 7th day post operatively. Surgical wound was healed uneventfully (Fig. 4).

REFERENCES


Hepatozoonosis is a tick-borne protozoan disease of dog and other carnivores, caused by *Hepatozoon canis*. The dog becomes infected with *Hepatozoon canis* by eating ticks or parts of tick body containing oocysts (Gevrey, 1993). The most common presentation of the infection in dogs is asymptomatic to mild disease, and it is usually associated with a low level of parasitemia involving 1 to 5% neutrophils (Baneth et al., 2003). Some dogs exhibit high parasitemia, often approaching 100 % of the peripheral blood neutrophils, and illness characterized by fever, anorexia, weight loss, anaemia, ocular discharge, weakness of the hind limbs and signs of chronic debilitating diseases (Baneth, 2001). It has been reported most frequently as a subclinical infection in the north-west region of India, with a prevalence range of 3 to 9% in Punjab (Gupta et al., 1994). One of the recent studies in India by Sarma et al., (2012) reported 5.45 % cases of *Hepatozoon canis* infection in dogs presented to TVCC, IVRI, Bareilly, UP during March to June, 2010. Here, an attempt has been made to study the clinical, hematobiochemical picture in a natural case of *Hepatozoon canis* infection in dog.

**CASE STUDY**

A male dog of non descript breed with a history of illness since last 6-7 days, anorexia, black coloured stools with difficulty in defecation, pale mucous membranes, intermittent fever was presented to Teaching Veterinary Complex of KNP college of Veterinary Science, Shirwal, Dist- Satara. Clinical examination revealed dyspnoea, weakness of legs leading to difficulty in getting up, pale mucous membranes and walking and temperature 100 °F. After thorough examination, the whole blood sample and serum were collected for hemato-biochemical examination. Hematological parameters like Hb, PCV, TEC, TLC, DLC, MCV, MCHC were estimated as per standard procedure. The biochemical parameters viz. total serum protein (TSP), serum albumin, serum glutamic oxaloacetate transaminase (SGPT), blood urea nitrogen (BUN) and serum creatinine were estimated by using commercial reagent kits on semiautomatic biochemistry analyzer (Erba Chem7).

**RESULTS AND DISCUSSION**

Blood smear stained with Leishman’s stain revealed cigar shaped, paler cytoplasmic bodies in the neutrophils (Fig. 1). These bodies were confirmed as gamonts of *H. canis* based on their morphological characteristics (Soulsby, 1982). Severity of the infection was judged by calculating percentage of neutrophils affected amongst 500 neutrophils observed under microscope. Parasitemia was observed in 3.5 % neutrophils. Rajamanickan et al. (1985) recorded 1-5 per cent parasitemia which is in support of the observation of the present study. Also, Ingole et al., (2011) reported 7.25 and 2 % parasitemia in two different clinical cases of hepatozoonosis in dogs. Hematological estimations were carried out and were interpreted in the lights of hydration status of the dog. Hematological values were Hb- 8.5 g/dl, PCV- 26.0 % , TEC- 4.8 X 10^6 /cumm, TLC- 9.5 X 10^3 /cumm , MCV- 54.16 fl and MCHC- 32.69 g/dl. The differential leucocyte count revealed 80 % neutrophils, 20 % lymphocytes, 0% eosinophils, 0% monocytes and 0% basophils. There was absolute neutrophilia without left shift. Ingole et al., (2011) and Baneth et al. (1995) observed neutrophilia with regenerative shift. This difference in observations can be attributed to the difference in severity and acuteness of the inflammatory process at the time of sample collection. The biochemical parameters viz. total serum protein (TSP), serum albumin, serum glutamic oxaloacetate transaminase (SGPT), blood urea...
Hepatozoon Canis Infection in a Non Descript Dog: Clinical and Haematobiochemical Study

The dog was treated with Tab. Doxycycline (Vibramycin)@10 mg/kg BW orally once a day for 21 days. Inj Dextrose Normal Saline was given @ 30 ml/kg BW i/v for first three days. Inj Imferon was administered @1 ml intramuscularly at weekly interval for three weeks. Dog showed signs of recovery 5th days onwards. However, treatment with Tab. doxycycline (Vibramycin) continued upto 21 days. After 21 days, the blood smear examination did not show parasitemia. Hepatozoonosis in dogs is underreported in this region and its report in dog demands surveillance of the same in this region using conventional and advanced diagnostic techniques.

REFERENCES


An 8 year old male dog was presented to the above department with the history of swelling at eyelid of left eye which was increased in size over a period of weeks and animal was unable to see properly. Clinical examination and palpation revealed swelling to be present on the palpebral conjunctiva which was continuously irritating the cornea and lead to corneal opacity along with corneal melanosis (Fig. 1). Hence, surgical intervention was planned for the case.

CASE STUDY

The surgical site was prepared aseptically. The animal was premedicated with atropine sulphate @ 0.04mg/kg subcutaneously followed by triflupromazine hydrochloride @ 1mg/kg body weight intravenously. General anaesthesia was induced with propofol @ 4mg/kg intravenously. Anaesthesia was maintained with 1/3 to ½ of induction dose when required. An elliptical incision was taken at the base of tumor. The soft tissue growth including surrounding healthy tissue was surgically removed completely and subcutaneous tissue was sutured with 3-0 chromic catgut in horizontal mattress manner (Fig. 2). This tissue was further sent for histopathological examination. Postoperatively, cefotaxim @ 20mg/kg, Vit-C @ 400mg, meloxicam @ 0.2mg/kg was given parenteral for 7 days with daily surgical wound dressing. The dog had an uneventfully recovery.

Histopathological examination revealed the tissue sample to be a fibrosarcoma (Fig. 3).

Eyelid neoplasms are the most frequent group of ophthalmic neoplasms in dogs. Adenoma, adenocarcinoma and fibrosarcoma of the meibomian gland are the most common lid neoplasms (~60%) in older dogs; local disfigurement and irritation needs excision, which is usually successful. Meibomian (sebaceous) adenocarcinomas are locally invasive and histologically malignant but are not known to metastasize. Lid melanomas, exhibited as spreading pigmented masses on the eyelid margin or a mass within the lid,
should be widely excised (Ehrhart, 2005). Soft-tissue fibrosarcomas develop from a variety of mesenchymal tissues, but they are often considered collectively, due to similarity in clinical behavior and histologic features. These tumors are locally invasive, with poorly defined histologic margins and neoplastic cells that often infiltrate through fascial planes. In general, local recurrence is common following conservative excision. (Ettinger, 2003).

REFERENCE


A 6 year old male dog was presented to the BSDP hospital for Animals with the history of swelling on forehead which was increased in size over a period of months and anorexia was noticed since 3 days. Clinical examination and palpation revealed swelling to be painless and round shaped hard mass (Fig.1).

**CASE STUDY**

The surgical site was prepared aseptically (Fig. 2). The animal was premedicated with atropine sulphate @ 0.04mg/kg and Inj. Dexamethasone @ 0.02mg/kg body weight subcutaneously followed by triflupromazine hydrochloride @ 1mg/kg body weight intravenously. General anaesthesia was induced with thiopentone sodium @11mg/kg intravenously. Anaesthesia was maintained with 1/3 to ½ of induction dose when required. An elliptical incision was taken around tumor. The hard tissue swelling including surrounding healthy tissue was surgically removed completely from the base and subcutaneous tissue was sutured with 2-0 chromic catgut in simple interrupted manner and skin in horizontal mattress manner with nylon. This tissue was further sent for histopathological examination. Postoperatively cefotaxim @ 20mg/kg, Vit-C @ 400mg, meloxicam @ 0.2mg/kg was given parenteral for 7 days with daily surgical wound dressing. The dog had an uneventfully recovery. Histopathological examination revealed the tissue sample to be a thrichoblastoma (Fig. 3).

Trichoblastoma has a high prevalence in dogs 4-9 year of age (Goldschmidt et al, 2005). In dogs, approximately 30% of all neoplasms are reported to arise in the skin. Adenexal tumours of the skin are very common in dogs. The development of adenexal is a result of an intimate interaction between basal and mesenchymal cells (Goldschmidt et al, 2005). Canine trichoblastoma is a tumor of basal epithelial cells that reside within the hair follicles in the skin. Trichoblastoma has been and still occasionally referred to as a basal cell tumor, a more general diagnosis for a variety of tumors that arise from similar basaloid epithelial cells. There are six subtypes of trichoblastoma: ribbon, medusoid, trabecular, spindle, granular cell, and clear cell types. Typical features of canine trichoblastoma: ribbon, medusoid, trabecular, spindle, granular cell, and clear cell types. Typical features of canine trichoblastoma are: slow growing, freely moveable within/beneath the skin, firm, usually solitary, and most commonly located on the head and neck (base of the ears is a very common location) but can occur anywhere in the skin. Trichoblastoma is fairly common in dogs, with Poodles and Setters at an increased risk of developing them. Older dogs are also at an increased risk of developing this type of
tumor. Trichoblastoma is a benign tumor and does not metastasize. Complete excision is curative and prognosis is excellent. Some dogs may develop more than one trichoblastoma throughout their lifetime.

REFERENCES


CASE HISTORY AND OBSERVATIONS

A Chow chow was presented at the BSPCA with a history of vomition and loose motions. The 8 year old male dog had a history of being medically treated for a few months. Radiograph of the abdomen showed hepatomegally, mild spleenomegaly with gas in the bowel. History included vomition after 1-2 hours of feed intake, reduced appetite. Abdominal palpation showed pain.

TREATMENT AND DISCUSSION

Exploratory laparotomy was indicated. The skin on the abdomen and pelvis was prepared for aseptic surgical procedure. The dog was pre-medicated with Atropine sulphate @0.02mg/kg bw s/c and dexamethasone @0.4mg/kg bw s/c. Sedation was carried out with Triflupromazine Hcl @ 1mg/kg bw i/v. Induction was carried out with thiopentone sodium @15mg/kg bw iv. Maintenance of anaesthesia was carried out with Isoflurane Hcl @ 2% flow rate with 1.5L/min oxygen. Ringer’s lactate @ 10ml/kg/hr was maintained.

An incision was taken on the ventral midline on the abdomen. A complete exploratory laparotomy was performed before a definitive ileo-caecal resection. A stricture was noted at the ileo-caecal junction. (Fig. 1). Resection of the junction was carried out followed by appropriate anastomosis (Fig. 2). Absorbable sutures of 3-0 catgut were used for Cushing-Lembert pattern of sutures. Non-absorbable sutures were taken on the skin.

The dog was kept nil by mouth for 3 days post operatively. Fluids along with Ceftriaxone @30mg/kg bw and metrogly @11mg/kg bw were administered iv for 3 days post-operatively. Pain management was carried out by using tramadol@3mg/kg bw i/v.

REFERENCES


Surgical Management of Lacerated Crop in an Indian Rock Pigeon (*Columba livia*)

*E. G. Thomas, M. S. Silveira, A. A. Datir, D. U. Lokhande, G. S. Khandekar, S. D. Tripathi*

Department of Veterinary Surgery & Radiology
Bombay Veterinary College, Parel, Mumbai - 400 012. Maharashtra.
*Corresponding Author : gteunice@gmail.com

Urbanization has taken its toll on all life forms, be it human or animals or birds. Birds such as crows and pigeons have adjusted well to the change unlike their smaller counterpart, the sparrows which have diminished greatly. All we can do now is to at least try and save our remaining feathered friends. A crop (ingluvies) is a large thin-walled diverticulum, which can store food for a short period of time and in chicken, it is displaced towards the right side of the median plane in front of the furcula on the pectoralis muscle (Greenacre and Morishita, 2014). The wounds over the cervical region may lead to tears in esophagus and trachea or fistulation of crop or sometimes both (Kumar *et al.* 2016). These fistulas and perforations can be detected easily by observing the spillage of feed or water through the wound, while the bird is taking the same through the mouth.

**CASE STUDY**

An Indian Rock Pigeon weighing 120g was presented at BSDP Animal Hospital, affiliated to Bombay Veterinary College, Mumbai with lacerated crop and wound on the neck (Fig. 1). It had accidentally flown in a rotating ceiling fan inside the house in which it had built a nest. On clinical examination, the jugular veins were intact but the crop and the skin over it on the ventral aspect was severely lacerated.

The bird was stressed and dehydrated. Hence, it was pre-oxygenated with oxygen for 10 minutes. Fluid therapy (Crystalloids) were administered (@ 50ml/kg body weight) subcutaneously at the pre-crural folds.

The bird was sedated with Diazepam @ 0.5mg/kg body weight. 2% Lignocaine HCl was used @ < 4 mg/kg as a local anaesthetic. The bird was oxygenated and was kept warm with the help of hot water bags intra-operatively. The surgical site was prepared aseptically by plucking of feathers and lavaging the wound with warm normal saline. The lacerated crop was exteriorized and the contents in the crop were removed. The crop was lavaged copiously with warm saline. The crop was sutured with Chromic Catgut 3-0 in a continuous pattern using Cushing-Lembert sutures. The skin was sutured in a simple continuous pattern using monofilament absorbable suture (Fig. 2).

The bird was kept nil by mouth for almost two days post-surgery. Hence, the bird was hydrated parenterally. Thereafter, the bird was maintained on a soft diet. An antibiotic (Cefotaxine Sodium @ 50mg/body weight IM) and painkiller (Meloxicam @ 0.2 mg/kg body weight IM) was given for 3 days postoperatively. The wound was dressed with Povidone-Iodine solution and Silverex-Chymoral forte paste (1:1) daily. The site was dressed daily for a week.

**Fig. 1:** Laceration due to traumatic injury on right side of neck in Indian Rock Pigeon

**Fig. 2:** Suturing of Crop and Skin with absorbable suture
RESULTS AND DISCUSSION

No anaesthetic complication was observed intra-operatively and the bird recovered from anaesthesia uneventfully. It was reported that use of 2% Lignocaine HCl @ < 4 mg/kg as a local anaesthetic was satisfactory for desired surgical intervention without any complication post-operatively (Patel, 2013). The bird recovered uneventfully without any post-operative complication within two weeks and was successfully released (Fig. 4). Trans-sectioned or severed oesophagus was considered as a rare finding as no reports were available in birds (Kumar et al. 2016). On the other hand, reports are available on afflictions of crop including fistulation in a hen due to sharp iron object (Phaneendra and Saibaba, 2015), crop injuries in birds by animal bites, foreign body ingestion, feeding excessively hot food grains etc. (Harrison, 1987), foreign body penetration causing crop injury in a pigeon (Basha et al., 2010). Trimming of the necrosed edges of the structure before its repair was advised by Bennett and Harrison (1994) in oesophageal perforations and Coles (2008) in fistulation of crop. It has been opined that oesophageal perforations may occur during the usage of rigid tubes for alimentation in excited birds or violently bobbing neonates (Bennett and Harrison, 1994).

It can be concluded that, early presentation and stabilization of the case with appropriate surgical intervention ensured an uneventful recovery with no postoperative complications.

REFERENCES


The common malignant neoplasms of the external genitalia of the mare are squamous cell carcinoma, melanoma and squamous papilloma (Sundberg et al., 1977). Squamous cell carcinoma accounts for approximately 20% of all equine tumors (Strafuss, 1976). The perianal, vulval and clitoris regions of mare accounts for 12% of equine squamous cell carcinoma cases. The causes of squamous cell carcinoma in mare have been suggested to include papilloma virus, trauma, chronic irritation, melanin deficiency and exposure to sunlight (McFadden and Pace, 1991).

**CASE STUDY**

A nine year old non-descript mare was brought to the TVCC with the complaint of protrusion of a reddish mass/growth from the vulval lips which was increasing since 2 months. The condition of the animal was clinically good and the perineum was soiled with black crusts (Fig. 1). On clinical examination, a cricket ball size growth attached firmly to the right ventral vulval commisure and involving the clitoris was found (Fig. 2). The surface of growth was encrusted, ulcerated and appeared bled intermittently at some points due to vigorous tail movement. The mare was operated for excision of growth with the consent of the owner.

The animal was made in lateral recumbent position after dissociative anaesthesia with xylazine HCl (@ 1 mg/kg body weight) and ketamine HCl (@ 2 mg/kg body weight) combination intravenously. Under strict aseptic conditions, the growth was carefully excised with electrocautery by giving lateral incisions on the healthy wall of the vulva (Fig. 3). The exposed edges were apposed by simple interrupted sutures using chromic catgut No. 2-0 (Fig. 4). The local dressing was done and parenteral antibiotic was given for 5 days. The animal showed an uneventful recovery without any complications and recurrence till 3 months of surgery. The exstripted mass was weighing 215 gm and the cut surface
showed solid texture inside (Fig. 5). The histopathological examination of the mass revealed squamous cell carcinoma (Fig. 6).

Squamous cell carcinoma is a common malignant neoplasm and has the tendency to develop in the unpigmented area of skin (Nair and Sastry, 1954). These tumors may be of erosive and productive types. The erosive type as seen in the present case are shallow encrusted ulcers, which if allowed to grow, may become deeper and crater like (Moulton, 1978). Squamous cell carcinomas are usually locally aggressive tumors, which invade surrounding tissues and metastasized to the local lymph nodes and the lungs in later stages of the disease (Karcher et al., 1990), but in the present case no metastasis was evident clinically as also reported by Singh et al., 2003.

REFERENCES


INSTRUCTIONS TO CONTRIBUTORS

The Journal of Bombay Veterinary College is a official organ of the Bombay Veterinary College Alumni Association and is published twice in a year. It is intended for the publication of review articles (guest), original/applied research articles, clinical observations, preliminary reports of scientific importance pertaining to Animal Health and Production. The work conducted during the last five years will only be considered for publication.

The official language of the Journal is English. The manuscripts are accepted on the basis of scientific importance and suitability for publication. Contributions that have already been published in part or full in any language will not be entertained. This however, does not apply to communications that may have appeared as letter to the Editor/abstract of contribution to a symposium, provided the paper submitted adds significantly to the information already published. The journal reserves the right for editorial cuts.

The manuscripts not exceeding 10-12 pages (A-4 size only) should be typed on one side of the paper, with wide margins and double spacing throughout except in abstracts, foot notes and references which should be in single spacing. The type script should be send in duplicate, each page should be numbered on the bottom center, including title page, references, tables etc. They should be sent after careful revision and correction and without overwriting, otherwise they will be rejected outright. The manuscripts should be sent to, “Editor, The Journal of Bombay Veterinary College, Dept. of Surgery & Radiology, Bombay Veterinary College, Parel, Mumbai-400 012”. The author must remit processing charges @ Rs. 100/- at the time of submission of manuscript. The charges should be paid by D.D. drawn in favour of Bombay Veterinary College, Alumni Association. After final correction etc. the article should be sent on a disc/C.D./Mail accompanied by a hard copy for printing. The manuscript should be typed in MS-Word document. The author/ other than the life members should pay for subscription of the journal (Rs. 1000) at the time of submission of the final corrected manuscript. The manuscript should be organised in the following order in general. Black and white / colour photo and graph prints will cost Rs. 200/- each, to be remitted on acceptance along with floppy. Also send the copy on the mail ID of the editor.

TITLE

Papers should be headed with short full title, the initial(s) and surname(s) of the author(s) and the name and address of the institution where the work was carried out with email of corresponding author. The title should be in sentence case. A shortened version of the title should be supplied for running headlines. The serial titles are not acceptable, so each paper should have an individual title.

ABSTRACT

This should not exceed 200 words and should outline briefly the purpose of the study, important findings and conclusions. Repetition and generally known information should be avoided. Key words (3 to 5) should follow the abstract to facilitate indexing. The abstract and key words should be in italics.

INTRODUCTION

This part should state briefly the nature and purpose of the work.

MATERIALS AND METHODS

The author(s) should describe materials, methods, apparatus, experimental procedures and statistical methods in detail to allow other workers to reproduce the results. The sub-headings, if necessary, may be used in this part.

RESULTS AND DISCUSSION

The experimental data should be presented clearly and concisely. Information presented in tables and figures should not be repeated in text. Discussions should focus on the interpretation given in the results.
References in this part should be cited as follows as observed by Gupta et al. (1984); or in parentheses were found (Sharma et al., 1983; Parihar and Pandey, 1988).

CONCLUSION
A brief conclusion of the entire work carried out should be narrated with highlights of major findings.

ACKNOWLEDGEMENT
This should be short. Grants and technical help provided should be acknowledged.

REFERENCES

a) For articles: All publications cited in the text should be presented in the form of a list of references arranged alphabetically according to author’s surnames. Do not give serial numbers. Use the following systems for arranging the references:


b) For thesis:


c) For Conference paper:


d) For books: Name(s) and initials of author(s), year of publication (In parentheses), title, edition, name of publication, page numbers.


Tables: Only essential and few tables should be included; typed on separate sheets and numbered in Roman numerals. Each table should have a brief and self explanatory title.

Figures: Only good quality, unfolded and unmounted glossy prints of half tone illustrations and clear line drawings in India ink are accepted. The number of figures, the authors name and top of figure should be indicated lightly on the back by soft pencil. The figures should be numbered sequentially by Arabic numbers. Each illustration should have a caption. The captions to all the figures should be referred to in the text and their approximate place be indicated on the margin. The author(s) are required to bear the cost of reproduction of illustrations and the cost of scanning of figures by D.D. which depends on the number of figures.

Abbreviations and Symbols: The metric system should be followed in the text. The quantities should be expressed in SI units. All other abbreviations should be spelled out when first used in the text.

Foot notes: These should be used only if absolutely essential. When used, they should be numbered in text, indicated by superscript numbers and kept as short as possible.

CLINICAL ARTICLES
Clinical case reports of interesting and rare nature are published under this heading should not contain more than three typed pages including references and illustrations and should be marked ‘Clinical Article’ at the right top corner of the first page of manuscript. An abstract of the case is not necessary. The manuscript should provide history and important clinical observations of the case, tentative diagnosis and its confirmation, line of treatment used and fate of the case. It should have a brief discussion on the line of treatment and conclusion. All these can be given in separate paragraphs sequentially and subheadings are not required.

The acknowledgments, if necessary may be given but it should be as short as possible. The references should be given as per format for the research articles.

SHORT COMMUNICATIONS
They should be in the general form as full length papers but should not exceed a maximum of three printed pages including tables and illustrations. The manuscript for this head should be clearly marked ‘Short Communication’ at the right top corner of the first page of manuscript. No abstract and Keywords required.
UNDERTAKING:

The authors will have to provide an undertaking in the following format - before publication:

UNDERTAKING

We the authors of the research article entitled, " ________________________________
______________________________________________________________
submitted to the Journal of Bombay Veterinary College undertake as under:

(a) That we have read the research article and take full responsibility of the validity of the contents of the paper and have no objection in getting it printed.

(b) The research article not been submitted to any other journal in future unless it is withdrawn in writing.

(c) The research / clinical article is based on the research carried out during the LAST FIVE YEARS.

(d) We agree that the chronology of the authors is as per the contribution in the research and all the persons who have actively contributed in the research have been included.

Date: 
Place:

Signature of authors

(1) Signature (2) Signature

Name : ____________________ Name : ____________________
Designation : ____________________ Designation : ____________________

(3) Signature (4) Signature

Name : ____________________ Name : ____________________
Designation : ____________________ Designation : ____________________

(5) Signature (6) Signature

Name : ____________________ Name : ____________________
Designation : ____________________ Designation : ____________________
Statement of Publication for The Journal of Bombay Veterinary College, under rule 8 of the Registration of Newspaper (Central) rule:

1. Publication : Bombay Veterinary College, Parel, Mumbai - 400 012.
3. Printer's Name : Dr. Bhavita S. Desai
   Nationality : Indian.
   Address : Red & Blue Cross Publication
             203, Creative Industrial Estate,
             N. M. Joshi Marg, Mumbai - 400 011.
4. Publisher's Name : Dr. Bhavita S. Desai
   Nationality : Indian.
   Address : Red & Blue Cross Publication
             203, Creative Industrial Estate,
             N. M. Joshi Marg, Mumbai - 400 011.
5. Editor's Name : Dr. G. S. Khandekar
   Nationality : Indian.
6. Name and address of Institution who owns the newspaper : Bombay Veterinary College Alumni Association.

Bombay Veterinary College, Parel, Mumbai - 400 012.

I, Bhavita Desai hereby declare that the particulars given above are true to the best of my knowledge and belief.

Sd/-

Date : 05/1/2017 Dr. Bhavita S. Desai
(Signature of the Publisher)

JOURNAL SUBSCRIPTION FORM

To,
The Editor,
The Journal of Bombay Veterinary College,
Parel, Mumbai - 400 012.

Dear Sir,

Please find enclosed herewith the remittance of Rs. 100/- (within India) & $50/- (outside India).
by Cheque / Demand Draft No. ____________ dated ________ of _________________________ Bank
in favour of "Bombay Veterinary College Alumni Association" for supply of the Journal for the year / from
______________________.

Name :
Address :
Country / State :

Signature of Subscriber
To,
The Secretary
Bombay Veterinary College Alumni Association,
Bombay Veterinary College,
Parel, Mumbai – 400 012.
(India).

Subject : Application for Life/Member/Sustaining/Donor Membership

Dear Sir,

Please enroll me as a  Life Member ☐  Member ☐  Sustaining Member ☐
Donor Member ☐ of Bombay Veterinary College Alumni Association from the year ________________

The Membership fee of Rs. ________ (Rs. ________ ) is sent herewith by cash
payment / D.D. No. ______________ Dated : ______________ / M.O. Receipt No. ______________
Dated : ______________ / Cheque No. ______________ Dated : ______________

Yours sincerely,

(Name : Dr. ______________)

Strike which ever is not applicable
Add Rs. 50/- for outstation cheque towards collection charges.
D.D. / Cheque/M.O. should be drawn in favour of “Bombay Veterinary College Alumni Association, Mumbai”.

(For office use only)

Membership No. _______________ 20 Dated : ______________

Reference : ______________
**BIO - DATA**

Name (In capital) ____________________________________________________________

(Surname) (First Name) (Middle Name)

Permanent (Home/Village) Address: ____________________________________________

_______________________________________________________ Tel. Nos. ____________

Qualifications: ______________________________________________________________

Field of Specialization: ______________________________________________________

__________________________________________________________________________

Present Posting: Designation: ________________________________________________

Organization: ______________________________________________________________

Address: _________________________________________________________________

_______________________________________________________

Tel. Nos. ______________________ E-mail: ________________________________

Year of Graduation from Bombay Veterinary College: B.Sc. (Vet) _____________ B.V.Sc. ________

B.V.Sc. & A.H. ________________ M.V.Sc. ________

Ph.D. _______________________

List of important achievements in the career:

1. ________________________________________________________________

2. ________________________________________________________________

3. ________________________________________________________________

4. ________________________________________________________________

Any other information: _________________________________________________

(Attach separate sheet if necessary) ____________________________________________