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# From the Editorial Desk...

Dear All,

It is our pleasure to present you with the Vol. 31: No.1 issue of Indian Journal of Veterinary Medicine of Indian Society for Veterinary Medicine.

The purpose of this initiative is to provide a platform that allows us to express ourselves and our views in all the clinical approach that we accomplish for the purpose of upholding our endeavour for livestock society with a greater opportunity and entrepreneurship and, to share the intellectual satisfaction of mind and heart of the Veterinary profession.

Since we have taken the editorial office at the Division of Medicine, Indian Veterinary Research Institute, Bareilly (UP) in 2010, we have designed varying magnitude of workflow solutions and its management for better relevance of our esteemed journal to the cause of veterinary society in a rewarding direction. We are happy to inform you all that these achievements have happened due to valuable suggestion, advice and directions of the veteran veterinarians of the society.

Looking ahead, it brings us a need to consolidate ourselves on our width and breadth of our services and we are glad to inform you all that we have successfully redesigned the cover page of IJVM from Vol. 31(01) issue by the advice of many scholarly persons in a A-4 size to incorporate more number of research articles to be published in a teeming manner and to reduce many backlog articles who deserves legitimate publication of the article. We take this opportunity to inform you all about creation of e-mail account: ijvmisvm@gmail.com for quick submission of articles and it may be seemed the benchmark initiation towards online submission of article and publication of esteemed research articles. Initiation has already been taken for obtaining NAAS impact factor which will boost our spirit in right direction.

We thank you all again, as this could not have been possible without your support. We also take this opportunity to thank the editorial team that is part of our proficiency development function in this initiative. Come, let us make a small beginnings in rebuilding this journal almost four decades after it was initiated for sowing, cultivating and harvesting knowledge. Let us rejuvenate its power to produce knowledge that is new, authentic and meaningful.

*Indian J. Vet. Med. Vol. 31, No. 2, 2011 pp. 65-68*

**Research Articles**

# Evaluation of Alternative Therapy against inclusion body hepatitis in broilers

*Anupriya Chandrakar, S.K. Shukla and Rajesh Kumar*[1]
Department of Clinical Medicine, Ethics and Jurisprudence
College of Veterinary and Animal Sciences, G.B. Pant University of Agriculture and Technology,
Pantnagar-263145, U.S. Nagar, Uttarakhand.

## Abstract

The present investigation was carried out on one hundred, day-old broiler chicks divided into 4 groups of twenty five chicks each. The birds of group 1 served as negative control. The chicks of group 2 were treated with Chelidonium Q, Alfa alfa Q and group 3 was treated with Hepatocare, Goutcare and Digevet for seven days after infection. The birds of group 4 were kept as positive control. The mortality rate of group 3 was lowest followed by group 2. Treated birds showed significant increase in Hb value, TEC, PCV and TLC along with non-significant increase in MCV, MCH and decrease in MCHC as compared to infected control. AST, ALT, AP and CK levels were significantly lower in all treated groups than infected control.

**Key words:** Broiler, Inclusion body hepatitis, drugs, treatment

Inclusion Body Hepatitis (IBH) occurs mainly in 3 to 7 weeks old chickens. It has been reported in chicks less than 1 week old (Pilkington *et al.*, 1997). A sudden onset and sharply increased mortality are seen with the disease. The most important clinical signs are weakness, anorexia, ruffled feathers with crouched posture extreme pallor of comb and wattles, reluctant to move and finally prostration with jaundice and anemia in some birds (Nayak *et al.*, 1990, Kumar *et al.*, 2003).

In field conditions the mortality has been noticed at an early age in broilers even after vaccination resulting in heavy losses to the farmers. So there is a need to ameliorate the effects of IBH by use of liver protectants, kidney repairing agents thereby minimizing the economic losses to farmers.

## Materials and Methods

For the present study, broiler chicks (100) of Indbro strain chicks were procured from the AGM Hatcheries, Haldwani, Uttarakhand. The broiler chicks were reared in deep litter brooding system under hygienic conditions and divided into 4 groups of twenty five chicks each. The birds of group 1 served as negative control. The birds of group 2 were given normal feed and then challenged with 2 ml of live virulent IBH virus (FAV 4 strain procured from Department of Veterinary Microbiology, College of Veterinary and Animal Sciences, Pantnagar) by subcutaneous route at 28 days of age. After challenge, the chicks were given Chelidonium Q @ 25 ml/100 bird b.i.d and Alfa alfa Q 12.5 ml/100 bird b.i.d. for seven days. The birds of group 3 were given normal feed and then challenged with 2 ml of live virulent IBH virus. After challenge, the chicks were given Hepatocare, Goutcare, Digevet each given @ 20 ml/100 birds once in a day for seven days. The birds of group 4 served as a positive control. Chicks of all groups were weighed at different intervals using pan balance at weekly interval. For study of haematological parameters, blood samples were collected from wing vein. Blood collection was done at 0, 2, 4, 6 and 8 day post infection. The blood samples were analyzed within 2 hour for Hb, PCV, TEC, TLC and DLC. The values of MCH, MCV, MCHC were calculated (Jain, 1986). The plasma from blood samples, collected at 0, 4 and 8 day post infection, in sterile vials containing heparin as anticoagulant and serum from blood collected in sterile vials was separated and used for analysis of total serum proteins, plasma albumin and golbulin, AST, ALT, AP and CK levels by Cogent kit (Span Diagnostics Ltd. Surat, Gujarat). Clinical signs and lesion were noted regularly. Histopathology was done by standard procedure. ELISA was performed by single dilution method as per procedure described by Chandrasekhar (1994).

Means and their standard errors were computed for various parameters and analysis of data was done by standard method of Snedecor and Cochran (1994).

## Results and Discussion

The birds of infected control showed clinical signs characteristic to IBH (Kumar *et al.*, 2003). However, intensity of clinical signs in treatment groups

[1]Department of Epidemiology & Preventive Medicine

**Table 1:** Effect of different homeopathic, ayurvedic and allopathic drugs on haematological parameters in IBH challenged chickens (Mean±SE).

| Parameter | Groups | Days post-infection | | | | |
|---|---|---|---|---|---|---|
| | | 0 | 2 | 4 | 6 | 8 |
| Haemoglobin | 1 | 110.32±3.04 | 112.34±1.97 | 114.36±3.92$^{adps}$ | 116.58±2.46 | 118.44±1.96 |
| | 2 | 114.60±1.47 | 112.40±1.47 | 79.36±3.85$^{bdqs}$ | 86.44±2.43 | 100.48±3.10$^{bdqs}$ |
| | 3 | 114.44±3.90 | 116.16±2.44 | 76.44±2.30$^{cdrs}$ | 86.48±2.90 | 100.40±1.09$^{cdrs}$ |
| | 4 | 110.32±3.04 | 112.28±3.66 | 54.24±2.39 | 78.52±1.96 | 90.24±0.79 |
| PCV | 1 | 31.80±1.24 | 32.60±0.87 | 32.40±0.75$^{adps}$ | 32.4±0.75 | 32.40±0.75 |
| | 2 | 32.20±0.68 | 31.80±1.02 | 22.80±1.16$^{bc}$ | 24.4±0.75 | 27.20±1.02 |
| | 3 | 30.80±1.20 | 31.00±0.45 | 20.80±0.80$^{cd}$ | 22.8±1.86 | 28.80±1.02 |
| | 4 | 30.20±0.67 | 30.80±1.02 | 18.20±0.58 | 22.6±0.87 | 26.60±0.98 |
| TEC | 1 | 3.39±0.09 | 3.23±0.06 | 3.27±0.03 | 3.28±0.03$^{adps}$ | 3.28±0.06$^{adps}$ |
| | 2 | 3.29±0.13 | 3.282±0.07 | 2.22±0.09$^{bc}$ | 2.37±0.04$^{bd}$ | 2.77±0.09 |
| | 3 | 3.19±0.04 | 3.07±0.05 | 2.01±0.06$^{cgrv}$ | 2.38±0.16$^{cdrs}$ | 2.89±0.06 |
| | 4 | 3.06±0.05 | 3.13±0.07 | 1.76±0.07$^{dgsv}$ | 2.09±0.04 | 2.76±0.08 |
| TLC | 1 | 23.70±0.19 | 21.81±0.19$^{adps}$ | 22.04±0.32$^{adps}$ | 22.65±0.58 | 24.00±0.17 |
| | 2 | 23.51±0.22 | 22.14±0.13$^{bcqr}$ | 22.59±0.11$^{bcqr}$ | 24.09±0.06$^{bcqr}$ | 24.91±0.24$^{bcqr}$ |
| | 3 | 23.54±0.17 | 20.55±0.06$^{cdrs}$ | 19.43±0.13$^{cdrs}$ | 20.16±0.08$^{cdrs}$ | 22.85±0.06$^{cdrs}$ |
| | 4 | 23.79±0.08 | 16.88±0.22 | 14.87±0.17 | 19.17±0.10 | 21.95±0.25 |
| PLC | 1 | 60.30±0.22 | 59.91±0.44$^{adps}$ | 59.55±0.23$^{adps}$ | 59.36±0.22$^{adps}$ | 59.13±0.26$^{adps}$ |
| | 2 | 60.29±0.21 | 57.58±0.22$^{bcqr}$ | 54.68±0.24$^{bcqr}$ | 56.12±0.06$^{bcqr}$ | 58.49±0.36$^{bcqr}$ |
| | 3 | 60.49±0.14 | 55.23±0.01$^{cdrs}$ | 53.51±0.05 $^{cdrs}$ | 54.56±0.17$^{cdrs}$ | 58.22±0.04$^{cdrs}$ |
| | 4 | 59.70±0.18 | 52.18±0.17 | 48.14±0.20 | 50.00±0.05 | 53.40±0.29 |
| PHC | 1 | 30.71±0.29 | 30.76±0.22$^{adps}$ | 30.31±0.01$^{adps}$ | 31.12±0.08$^{adps}$ | 31.07±0.20$^{adps}$ |
| | 2 | 30.57±0.15 | 35.24±0.23$^{bdqs}$ | 37.67±0.11$^{bcqr}$ | 34.59±0.04 | 32.99±0.42 |
| | 3 | 30.47±0.24 | 36.55±0.02$^{bcqr}$ | 38.51±0.02 | 35.98±0.21$^{cdqs}$ | 32.45±0.06$^{cdqs}$ |

Values having similar subscript a, b, c, d, e ($p<0.05$) and p, q, r, s, t ($p<0.01$) differed significantly when compared among differnt groups.

was less than the control group. Pale comb and wattle were not seen in the birds receiving homeopathic treatment. These findings demonstrate that drugs were able to reduce the intensity of clinical signs in birds.

The lesions in the birds of treatment group revealed enlarged and pale yellow liver. The haemorrhages were present but comparatively less than that of infected control. Kidney showed mild haemorrhages on the surface and were pale yellow in colour. The carcass was pale but the paleness was less than that of infected control. Similarly, histopathology of liver of chicks receiving homeopathy treatment (Group 2) showed mild to moderate degeneration of hepatocytes, haemorrhages and congestion along with mononuclear cell infiltration. Kidneys revealed moderate degeneration and necrosis of tubular epithelium along with mononuclear cell infiltration. The liver of Hepatocare treated birds (group 3) revealed mild to moderate haemorrhages along with mononuclear cell infiltration and kidneys revealed hyperemia and haemorrhage with slight to moderate damage to tubules in comparison to infected control. The intensity of lesions was lesser than that of infected control because of the rapid repair of the tissues augmented by the drugs administration such as Hepatocare, Goutcare, Celandine and Alfa alfa Q (Boericke, 2007).

Treated groups showed higher weight gain and feed consumption than infected control during the disease course. Hepatocare and Digevet forte given to this group enhanced the function of liver and kidneys. Alfa alfa Q has its action on sympathetic nerves favourably influencing nutrition, evidenced by the "toning up" of appetite and digestion, resulting in a greatly improved mental and physical vigour, with weight gain (Boericke, 2007).

The mortality rate of treated group was lower than the infected control group. Low mortality rate in the treated group may be due to the protective effect of drugs on liver and kidneys. Shukla (1998) also concluded that Hepatocare can be safely used in bringing down the incidence of Inclusion body hepatitis-Hydropericardium syndrome in affected birds when used continuously in feed @ 2kg/ton.

Group 2 and 3 birds had highly significant ($p<0.05$) Hb values than group 4 (infected control) on

**Table 2:** Effect of different homeopathic, ayurvedic and allopathic drugs on biochemical parameters in IBH challenged chickens (Mean±SE).

| Parameter | Groups | Days post-infection | | |
|---|---|---|---|---|
| | | 0 | 4 | 8 |
| TP | 1 | 42.04±1.13 | 42.63±0.26$^{adps}$ | 43.45±1.48$^{adps}$ |
| | 2 | 44.23±0.30 | 42.64±0.44$^{bdqs}$ | 45.82±0.38$^{bdqs}$ |
| | 3 | 44.66±0.31 | 42.62±0.58$^{cdrs}$ | 50.41±1.01$^{bcqr}$ |
| | 4 | 42.94±1.28 | 27.63±1.20 | 38.39±1.29 |
| albumin | 1 | 18.92±0.42 | 19.16±0.07$^{adps}$ | 19.56±0.74$^{adps}$ |
| | 2 | 19.92±0.09 | 18.37±0.36$^{bdqs}$ | 20.21±0.10$^{bdqs}$ |
| | 3 | 19.86±0.18 | 18.40±0.27$^{cdrs}$ | 22.19±0.48$^{bc}$ |
| | 4 | 19.12±0.64 | 13.99±0.69 | 16.36±0.51 |
| globulin | 1 | 22.90±0.75 | 23.46±0.29$^{adps}$ | 24.08±0.74 $^{adps}$ |
| | 2 | 24.30±0.31 | 24.26±0.09$^{bdqs}$ | 25.60±0.29$^{bdqs}$ |
| | 3 | 24.81±0.17 | 24.21±0.34$^{cgrs}$ | 28.21±0.54$^{bcqr}$ |
| | 4 | 23.83±0.69 | 16.44±0.69$^{dgsv}$ | 22.02±0.78$^{dgsv}$ |
| AST | 1 | 117.24±4.40 | 115.07±2.89$^{adps}$ | 114.50±5.37$^{adps}$ |
| | 2 | 118.81±4.55 | 126.19±3.07$^{bgqv}$ | 121.21±2.03$^{bdqs}$ |
| | 3 | 109.42±2.40 | 118.12±4.11$^{cdrs}$ | 117.64±5.30$^{cgrv}$ |
| | 4 | 121.16±2.14 | 173.81±1.82 | 172.85±3.74 |
| ALT | 1 | 33.82±1.81 | 33.87±0.89 $^{adps}$ | 34.83±2.43$^{adps}$ |
| | 2 | 33.83±0.85 | 45.27±0.61$^{bdqs}$ | 36.21±1.16$^{bdqs}$ |
| | 3 | 34.18±1.20 | 45.21±0.64$^{cdrs}$ | 38.46±0.81$^{cd}$ |
| | 4 | 33.85±0.93 | 60.14±1.11 | 43.17±0.60 |
| AP | 1 | 282.19±2.29 | 284.81±2.96$^{adps}$ | 275.54±4.06$^{adps}$ |
| | 2 | 281.49±0.95 | 288.67±1.12$^{bdqs}$ | 280.17±0.05$^{bdqs}$ |
| | 3 | 280.03±0.56 | 288.13±2.33$^{cdrs}$ | 283.50±0.93$^{cdrs}$ |
| | 4 | 279.72±0.41 | 316.54±4.69 | 292.11±1.62 |
| CK | 1 | 56.52±0.67 | 56.89±0.72$^{adps}$ | 55.86±0.75$^{adps}$ |
| | 2 | 55.69±0.65 | 61.82±0.87$^{bdps}$ | 57.46±0.68$^{bdps}$ |
| | 3 | 54.18±1.20 | 62.11±1.15$^{cdrs}$ | 55.82±0.32$^{cdrs}$ |
| | 4 | 56.50±0.91 | 75.53±0.66 | 67.91±0.93 |

Values having similar subscript a, b, c, d, e ($p<0.05$) and p, q, r, s, t ($p<0.01$) differed significantly when compared among differnt groups.

4th and 8th post-infection (PI) days. The TEC of group 2 was significantly higher ($p<0.01$) than that of group 3 and 4 on 4th day of infection and the difference remained significant up to 8th day of infection (Table-1). Such increase in Hb, TEC and PCV value, by administration of liver protectants and Alfa alfa Q has also been observed by other investigators (Singh, 2007, Joshi and Kumar, 1987).

MCH level in group 2 and 3 were significantly lower ($p<0.05$) than group 4 on 4th day of infection. The MCHC values of group 2 and 3 were significantly higher ($p<0.05$) than group 4 on 4th day of infection with non significant difference up to 8th day of infection. The MCHC level in group 3 was highly significant ($p<0.05$) than group 2 on 4th day of infection and after that difference became non-significant. TLC and PLC values in group 2 was highly significant and PHC value significantly ($p<0.05$) lower than that of group 3 and 4 on 2nd day of infection and remained significant up to 8th day of infection. The albumin, TP, AST, ALT, AP and CK values values in group 2 and 3 were significantly higher ($p<0.05$) than group 4 on 4th day PI and remained significant up to the 8th day PI (Table-1 &2). Similar findings are reported by various investigators using homeopathic and aurvedic drugs in similar studies (Singh, 2007, Kuppuswamy, 1986, Kutlu and Forbes, 1993, Madrewar, 2003, Maiti *et al.*, 1990, Mishra and Grewal, 2000).

Chelidonium Q (Celandine) is a prominent liver remedy, covering any of the direct reflex symptoms in the disease condition of this organ. Thus it was able to cope up with aftermath of the liver damage in the body thus maintaining the protein, albumin and globulin level in the body. The lipotropic agents, liver stimulants, antioxidants, mould inhibitors and toxin binders in Hepatocare and herbal extracts of Goutcare might have improved the renal efficiency, nephrotic tissue agents would have stimulated nephrotic tissues, rejuvenated damaged cells and helped

in normal functioning of kidneys. Diuretics in it would have prevented the excess accumulation of excess fluids and help in flushing (Hirwade, 1993, Narhari, 1996, Shukla, 1998, Singh *et al.*, 2005).

The ELISA absorbance value of group 2 was significantly higher ($p<0.01$) than group 3 on 45$^{th}$ day of age. Its values in group 2 and 3 on 45$^{th}$ day were 1.24±0.04 and 1.18±0.05, respectively. The homeopathic treated group also showed significant increase in humoral immune response than the infected control. Chelidonium has cytostatic, cytotoxic effects against cancer cell lines and has immunomodulatory activity as well (Ernst and Schmidt, 2005, Maiti *et al.*, 1990, Tripathi *et al.*, 2004).

The homeopathic drugs like Chelidonium Q and Alfa alfa Q are useful in decreasing the severity of disease and reducing the mortality rate. The liver protectant (Hepatocare), kidney repairing agent (Goutcare) and Digevet forte are helpful in supporting the vital organs during disease outbreak thus maintaining the feed consumption and weight gain and decreasing the mortality rate.

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# Clinico- epidemiological feature of endemic goitre in goats maintained in sub-Himalayan tarai of U.P. and Uttarakhand

*Satyendra Kumar, S.K. Shukla, J.L. Singh and Mahesh Kumar*
Department of Clinical Medicine, College of Veterinary and Animal Sciences
G.B. Pant University of Agriculture & Technology, Pantnagar- 263 145, Udham Singh Nagar, Uttarakhand.

## Abstract

The clinical survey in 13 districts of Uttar Pradesh and Uttarakhand revealed 58.23%, prevalence of goitre in goats. The prevalence was highest in Bareilly (69.04%) and lowest in J.P. Nagar (36.15%). The affected goitrous goats had hard swelling of variable size thyroid glands on both side of the neck, stillbirth/abortion, anoestrous, retention of placenta among females, emaciation, coarseness of hairs and whitish discolouration of mucous membrane. The iodine content in feed/fodder, soil and water samples of the study area were 0.126 – 0.303 ppm, 2.22 – 5.66 ppm and 0.0060 – 0.0266 ppm, respectively. The range values of thyroid hormone profile in mild, moderate and severely affected goitrous goats of study area were 61.52-69.34 n mol/l, 50.62-57.82 n mol/l and 40.21-52.28 n mol/l ($T_4$), 1.93-2.30 n mol/l, 1.54-1.93 n mol/l and 1.26-1.51 n mol/l ($T_3$) and 13.81- 14.56 µ mol/l, 16.81-19.26 µ mol/l and 22.18-24.38 µ mol/l (TSH), respectively.

**Keywords:** Epidemiology, Goats, Goitre, Iodine deficiency, Thyroid hormone profile.

Generally, iodine deficiency symptoms are associated with specific geographical locations where the soil is deficient in iodine (Radostits *et al.*, 2007) such as Great Plains, Rocky Mountains, Pacific coast, Great lakes in USA and large area of sub-Himalayan tarai and indogangetic planes in India. It is estimated that over one billion people are at the risk of iodine deficiency disorders (Hetzel, 1991). Of these, 200 millions have goitre and 20 millions are suffering from brain damage due to deficiency of iodine in pregnancy and infancy. There are reports of concurrent occurrence of goitre in animals in many of those areas where endemic goitre occurs in man (Kelly and Sneddon, 1960). Amongst animals, goats appear to be more susceptible and to a lesser degree are sheep, horse and pigs, and cattle seem to be more resistant to both development of congenital goitre and associated effects of hypothyroidism (Lee *et al.*, 1999). The present paper reports clinico-epidemiological feature of endemic goitre prevailing in the tarai area of U.P. and Uttarakhand along with reason for iodine deficiency.

## Materials and Methods

A random clinical survey of various parts of 13 districts of tarai region of Uttar Pradesh and Uttarakhand, namely Pilibhit, Azamgarh, Bareilly, Champavat (plain area), Dehradun, Haridwar, J.P. Nagar, Lahimpur Khiri, Moradabad, Nainital (plain area), Rampur, Sitapur, and U.S. Nagar was conducted to record the prevalence of goitre among goats. On the basis of survey, the goats which had clinical signs suggestive of goitre were identified and standard protocol developed by Perez *et al.* (1960) was used for gradation of goitre (Table 1). The non-biological and biological (serum) samples were collected to find out reason for iodine deficiency and status of goitre.

Approximately one kg soil samples were collected from the 5 (4 corners and 1 center) spots of various places of clinical survey areas as per method described by Wheeler and Fell (1980) for the estimation of iodine. All these samples were air dried and crushed with wooden roller, passed through 2 mm sieve and stored in properly labeled polythene bags for further use.

Water samples from different sources, viz. river, hand pump, tube well and artesian well of various places

**Table 1:** Grading of goitre as per classification of Perez *et al.* (1960)

| S.No. | Stages | Clinical observation |
|---|---|---|
| 1. | Stage 0 | No goitre |
| 2. | Stage 1a | Goitre detectable |
| 3. | Stage 1b | Goitre palpable and visible only when neck is fully extended. |
| 4. | Stage 2 | Goitre visible with neck in normal position, palpation is not needed for diagnosis |
| 5. | Stage 3 | Very large goitre that can be recognized from a distance |

[1]Department of Medicine, DUVASU, Mathura.
[2]Department of Medicine, Bombay Veterinary College, Mumbai.

of survey areas were collected in thoroughly cleaned and sterilized polypropylene bottles for estimation of iodine content. At least 10 composite samples measuring 100 ml were collected from each of the study areas. These samples were stored at -20$^0$ C till analysis.

Feed and fodder samples were collected from the different study areas. At least 10 samples of feed/ fodder (each equivalent to 100 g DM), were collected from a single place/source. These samples were pooled to make one composite sample according to their types. A minimum of 5 composite samples were collected for different feed/fodder from each of the study area (Wheeler and Fell, 1980). Blood samples were collected from goitre affected goats from study areas.

Iodine value in feed/fodder (Bedi, 1999) and soil (Bedi and Pattnaik, 1998) samples was estimated. In water samples, iodine was estimated directly by the Orion Iodide Electrode {(9653BN), Thermo Electron Corporation, 166 Cummings Centre, Beverly, MAO1915, USA} after adding ISA (Ionic strength adjuster) in the water samples.

Serum thyroxine ($T_4$), triiodothyronine ($T_3$) and thyroid stimulating hormone (TSH) were estimated by RIA technique using Gamma scintillation counter in the Nuclear Research Laboratory of the Division of Physiology and Climatology, I.V.R.I., Izatnagar using the method of Chopra (1972). The values of $T_4$, $T_3$ and TSH were calculated from standard linear curve of known amount against their binding percentage.

## Results

Overall prevalence of goitre was 58.23% with cases of mild goitre as 33.40%, moderate 18.70% and severely affected 6.56%. However, among the affected population, highest value of mild, moderate and severe form of goitre was recorded in Udham Singh Nagar (41.31%), Bareilly (23.33%) and Nainital (13.77%), respectively (Table 2). The prevalence of goitre among the study area was highest in Bareilly (69.04%) followed by Udham Singh Nagar (66.55%) and Pilibhit (63.54%). The Prevalence of goitre among the studied districts was lowest in J.P. Nagar (36.15%). The affected goitrous goats had hard swelling of variable size (walnut to duck egg size) palpable on both side of the neck, still birth/abortion, anoestrous, retention of placenta among females, emaciation, coarseness of hairs and whitish discolouration of mucous membrane. However, distribution of major signs in congenital goitrous kids born out of goitrous doe were enlargement of thyroid gland, letharginess, waddling gait, hydrocephalus, prognathic face, flexion of limb joints, arching back, thyroid thrill and partial alopecia.

The highest and lowest values of iodine content in feed/fodder was recorded in J.P. Nagar (0.303± 0.006 ppm) and Bareilly (0.126± 0.009 ppm), respectively, while in soil highest and lowest iodine values were recorded in plain areas of Nainital (5.660± 0.442 ppm) and Bareilly (2.220± 0.265 ppm) (Table 3). The highest and lowest values of iodine content in water were recorded in Azamgarh (0.0266± 0.0036 ppm) and plain areas of Nainital (0.006± 0.0007 ppm).

The lowest levels of $T_4$, $T_3$ and highest level of TSH in cases of mild, moderate and severe form of goitre were in the goitrous goats of Bareilly district, while the highest levels of $T_4$, $T_3$ and lowest level of TSH were in the goitrous goats of J.P. Nagar district (Table 4).

## Discussion

Overall, prevalence of goitre in the area was found very high (58.23%). Singh *et al.* (2002) noticed high incidence of goitre in goats reared in the sub-Himalayan tarai region of Kumaon. High incidence of goitre in goats was also reported by Shivakumar (2007). Raina and Pachauri (1984) observed 5.66% incidence of goitre in Pantnagar on the basis of hospital data recording. Lesser incidence rate recorded by them may be due to the difference in the data recording system or difference in the criteria used for the diagnosis of goitre or cases are not truly diagnosed during clinical investigation.

The common clinical observations of the affected goitrous goats and congenital goitrous kids out of goitrous doe were similar to those reported by Wilson (1975), Raina and Pachauri (1984), Coda *et al.* (1991) Al-Ani *et al.* (1998) and Singh (2001).

The principal causes of iodine deficiency in animals are consumption of water, feed and fodder grown on iodine deficient soil in endemic areas, whereas prevalence of goitrogenous plant or feeding of goitrogenous feed may be due to natural or anthropogenic origin. So diet is the major source of iodine intake in many species of animals. Goats mainly absorb iodine from ingested vegetation and water.

**Table 4:** Thyroid hormone profile in clinically affected goitrous goats of different districts

| S.No. | Name of Districts | Thyroidhormone | Stages of goitre | | | |
|---|---|---|---|---|---|---|
| | | | Stage 0 (Normal) | Stage I (Mild) | Stage II (Moderate) | Stage III (Severe) |
| 1. | Pilibhit | $TT_4$ (n mol/l) | 93.86± 9.23 (n = 8) | 63.81± 6.45 (n = 8) | 52.98± 5.48 (n = 6) | 43.97± 4.56 (n = 4) |
| | | $TT_3$ (n mol/l) | 2.54± 0.215 (n = 8) | 1.98± 0.188 (n = 8) | 1.64± 0.152 (n = 6) | 1.30± 0.126 (n = 4) |
| | | TSH (µ mol/l) | 10.36± 1.13 (n = 8) | 14.12± 1.23 (n = 8) | 18.14± 1.78 (n = 6) | 23.65± 2.12 (n = 4) |
| 2. | Lakhimpur Khiri | $TT_4$ (n mol/l) | 101.84± 9.56 (n = 6) | 68.24± 6.12 (n = 6) | 57.53± 5.36 (n = 4) | 51.23± 4.97 (n = 2) |
| | | $TT_3$ (n mol/l) | 2.64± 0.214 (n = 6) | 2.28± 0.212 (n = 6) | 1.91± 0.210 (n = 4) | 1.49± 0.167 (n = 2) |
| | | TSH (µ mol/l) | 10.76± 1.12 (n = 6) | 13.24± 1.36 (n = 6) | 16.86± 1.71 (n = 4) | 22.32± 2.25 (n = 2) |
| 3. | Sitapur | $TT_4$ (n mol/l) | 102.43± 9.86 (n = 8) | 67.12± 6.71 (n = 8) | 56.82± 5.60 (n = 5) | 50.18± 5.51 (n = 4) |
| | | $TT_3$ (n mol/l) | 2.62± 0.123 (n = 8) | 2.26± 0.321 (n = 8) | 1.89± 0.190 (n = 5) | 1.48± 0.136 (n = 4) |
| | | TSH (µ mol/l) | 10.81± 1.13 (n = 8) | 13.31± 1.32 (n = 8) | 16.96± 1.58 (n = 5) | 22.45± 2.26 (n = 4) |
| 4. | Bareilly | $TT_4$ (n mol/l) | 96.45± 9.98 (n = 10) | 61.52± 6.68 (n = 10) | 50.62± 4.98 (n = 8) | 40.21± 4.12 (n = 6) |
| | | $TT_3$ (n mol/l) | 2.56± 0.321 (n = 10) | 1.93± 0.210 (n = 5) | 1.54± 0.148 (n = 8) | 1.26± 0.118 (n = 6) |
| | | TSH (µ mol/l) | 10.58± 1.24 (n = 10) | 14.56± 1.51 (n = 5) | 19.26± 1.88 (n = 8) | 24.38± 2.44 (n = 6) |
| 5. | Azamgarh | $TT_4$ (n mol/l) | 98.63± 8.87 (n = 7) | 66.21± 6.42 (n = 5) | 54.94± 5.36 (n = 4) | 47.72± 4.81 (n = 3) |
| | | $TT_3$ (n mol/l) | 2.48± 0.241 (n = 7) | 2.15± 0.204 (n = 10) | 1.74± 0.167 (n = 4) | 1.43± 0.133 (n = 3) |
| | | TSH (µ mol/l) | 10.71± 1.23 (n = 7) | 13.79± 1.41 (n = 10) | 17.46± 1.75 (n = 4) | 23.86± 2.25 (n = 3) |
| 6. | Rampur | $TT_4$ (n mol/l) | 97.68± 8.89 (n = 10) | 64.06± 6.12 (n = 10) | 53.98± 5.42 (n = 8) | 45.18± 4.47 (n = 6) |
| | | $TT_3$ (n mol/l) | 2.66± 0.321 (n = 10) | 2.08± 0.124 (n = 10) | 1.70± 0.162 (n = 8) | 1.38± 0.141 (n = 6) |
| | | TSH (µ mol/l) | 10.65± 1.12 (n = 10) | 14.00± 1.36 (n = 10) | 17.68± 1.68 (n = 8) | 23.14± 2.21 (n = 6) |
| 7. | J.P.Nagar | $TT_4$ (n mol/l) | 100.82±9.98 (n = 8) | 69.34± 7.12 (n = 6) | 57.82± 4.98 (n = 4) | 52.28± 4.96 (n = 2) |
| | | $TT_3$ (n mol/l) | 2.68± 0.322 (n = 8) | 2.30± 0.214 (n = 6) | 1.93± 0.169 (n = 4) | 1.51± 0.144 (n = 2) |
| | | TSH (µ mol/l) | 10.82± 1.14 (n = 8) | 13.18± 1.45 (n = 6) | 16.81± 1.71 (n = 4) | 22.18± 2.22 (n = 2) |
| 8. | Dehradun | $TT_4$ (n mol/l) | 101.21± 10.32 (n = 6) | 65.96± 7.21 (n = 6) | 56.18± 6.10 (n = 4) | 49.10± 4.65 (n = 3) |
| | | $TT_3$ (n mol/l) | 2.56± 0.148 (n = 6) | 2.20± 0.198 (n = 6) | 1.81± 0.157 (n = 4) | 1.46± 0.151 (n = 3) |
| | | TSH (µ mol/l) | 10.76± 1.16 (n = 6) | 13.56± 1.41 (n = 6) | 17.21± 2.10 (n = 4) | 22.61± 2.25 (n = 3) |
| 9. | Champavat(plain area) | $TT_4$ (n mol/l) | 99.98± 10.21 (n = 8) | 66.22± 5.88 (n = 6) | 56.41± 4.98 (n = 4) | - |
| | | $TT_3$ (n mol/l) | 2.58± 0.244 (n = 8) | 2.23± 0.189 (n = 6) | 1.86± 0.179 (n = 4) | - |
| | | TSH (µ mol/l) | 10.78± 1.34 (n = 8) | 13.43± 1.45 (n = 6) | 17.06± 1.68 (n = 4) | - |
| 10. | U.S.Nagar | $TT_4$ (n mol/l) | 88.98± 8.74 (n = 10) | 63.34± 5.98 (n = 10) | 52.65± 5.34 (n = 10) | 42.57± 4.26 (n = 6) |
| | | $TT_3$ (n mol/l) | 2.60± 0.323 (n = 10) | 1.96± 0.202 (n = 10) | 1.56± 0.161 (n = 8) | 1.28± 0.114 (n = 6) |
| | | TSH (µ mol/l) | 10.30± 1.04 (n = 10) | 14.21± 1.36 (n = 10) | 18.45± 1.93 (n = 8) | 23.82± 2.41 (n = 6) |
| 11. | Haridwar | $TT_4$ (n mol/l) | 93.76± 8.86 (n = 8) | 63.91± 5.87 (n = 8) | 53.40± 4.97 (n = 6) | 44.08± 4.41 (n = 4) |
| | | $TT_3$ (n mol/l) | 2.63± 0.188 (n = 8) | 2.02± 0.189 (n = 8) | 1.68± 0.152 (n = 6) | 1.34± 0.132 (n = 4) |
| | | TSH (µ mol/l) | 10.34± 1.21 (n = 8) | 14.04± 1.35 (n = 8) | 17.88± 1.84 (n = 6) | 23.42± 2.36 (n = 4) |
| 12. | Nainital (plain area) | $TT_4$ (n mol/l) | 99.14± 9.68 (n = 8) | 65.88± 6.24 (n = 8) | 55.98± 5.34 (n = 5) | 48.96± 3.98 (n = 5) |
| | | $TT_3$ (n mol/l) | 2.52± 0.251 (n = 8) | 2.18± 0.198 (n = 8) | 1.79± 0.132 (n = 5) | 1.45± 0.139 (n = 5) |
| | | TSH (µ mol/l) | 10.68± 1.14 (n = 8) | 13.62± 1.43 (n = 8) | 17.28± 1.82 (n = 5) | 22.72± 2.32 (n = 5) |
| 13. | Moradabad | $TT_4$ (n mol/l) | 93.98± 8.98 (n = 9) | 65.12± 6.57 (n = 9) | 54.68± 5.62 (n = 7) | 46.32± 4.56 (n = 5) |
| | | $TT_3$ (n mol/l) | 2.45± 0.325 (n = 9) | 2.12± 0.321 (n = 9) | 1.71± 0.156 (n = 7) | 1.40± 0.136 (n = 5) |
| | | TSH (µ mol/l) | 10.58± 1.11 (n = 9) | 13.88± 1.28 (n = 9) | 17.56± 1.38 (n = 7) | 23.02± 1.98 (n = 5) |

**Table 2:** Prevalence of goiter in goats in different tarai districts of Uttar Pradesh and Uttarakhand

| S.No. | District surveyed | Total no. of goats screened | No. of affected goats | | | Total no. of affected goats | Overall percentage |
|---|---|---|---|---|---|---|---|
| | | | Mild | Moderate | Severe | | |
| 1. | Pilibhit | 310 | 100(32.25%) | 62(20%) | 35(11.29%) | 197 | 63.54% |
| 2. | Azamgarh | 270 | 90(33.33%) | 45(16.66%) | 9(3.33%) | 144 | 53.33% |
| 3. | Bareilly | 2100 | 770(36.66%) | 490(23.33%) | 190(9.04%) | 1450 | 69.04% |
| 4. | Champavat (plain area) | 250 | 82(32.80%) | 30(12.00%) | - | 112 | 44.80% |
| 5. | Dehradun | 230 | 70(30.43%) | 35(15.21%) | 6(2.60%) | 111 | 48.26% |
| 6. | Haridwar | 380 | 126(33.15%) | 64(16.84) | 16(4.21%) | 206 | 54.21% |
| 7. | J.P. Nagar | 260 | 59(22.69%) | 33(12.69%) | 2(0.76%) | 94 | 36.15% |
| 8. | LakhimpurKhiri | 465 | 120(25.80%) | 61(13.11%) | 3(1.17%) | 184 | 39.56% |
| 9. | Moradabad | 580 | 156(26.89%) | 103(17.75%) | 29(5.00%) | 288 | 49.65% |
| 10. | Nainital(plain area) | 630 | 133(21.11%) | 114(18.09%) | 85(13.49%) | 332 | 52.70% |
| 11. | Rampur | 345 | 94(27.24%) | 50(14.29%) | 39(11.30%) | 183 | 53.04% |
| 12. | Sitapur | 225 | 65(28.88%) | 19(7.45%) | 8(3.55%) | 92 | 40.88% |
| 13. | U.S.Nagar | 1525 | 630(41.31%) | 310(20.32%) | 75(4.91%) | 1015 | 66.55% |
| | | | 2495(33.40%) | 1416(18.70%) | 497(6.56%) | | |
| | **Total** | **7,570** | | | **Total affected** | **4,408** | **58.23%(Av.)** |

**Table 3:** Iodine concentration in soil, water, feed and fodder samples collected from study areas.

| S.No. | District Mapped | Iodine content in ppm (mean ± SE) | | |
|---|---|---|---|---|
| | | Soil | Water | Feed &fodder |
| 1. | Pilibhit | 2.74 ± 0.40 | 0.0157 ± 0.0019 | 0.208 ± 0.212 |
| 2. | LakhimpurKhiri | 4.26 ± 0.42 | 0.0208 ±0.0012 | 0.282±0.015 |
| 3. | Sitapur | 3.54 ± 0.35 | 0.0170 ± 0.0010 | 0.254 ± 0.018 |
| 4. | Bareilly | 2.22±0.26 | 0.0134±0.0011 | 0.126±0.009 |
| 5. | Azamgarh | 2.33±0.09 | 0.0266±0.0036 | 0.210±0.015 |
| 6. | Rampur | 2.62±0.34 | 0.0123±0.0011 | 0.182±0.018 |
| 7. | J.P.Nagar | 3.10±0.08 | 0.0178±0.0025 | 0.303±0.006 |
| 8. | Dehradun | 3.90±0.76 | 0.0138±0.0028 | 0.221±0.015 |
| 9. | Champavat(plain area) | 3.58±0.16 | 0.0129±0.0015 | 0.165±0.006 |
| 10. | U.S.Nagar | 2.34±0.25 | 0.0124±0.0012 | 0.131±0.026 |
| 11. | Haridwar | 2.96±0.38 | 0.0127±0.0010 | 0.194±0.036 |
| 12. | Nainital(plain area) | 5.66±0.44 | 0.0060±0.0007 | 0.247±0.145 |
| 13. | Moradabad | 2.80±0.25 | 0.0178±0.0038 | 0.158±0.006 |
| | Average range | 2.22 – 5.66 ppm | 0.0060 – 0.0266 ppm | 0.126 – 0.303 ppm |

Relation between iodine concentration and incidence of goitre is well established. Iodine deficiency in an area is mainly judged from iodine content in soil, level of iodine in drinking water and iodine content in the feed-fodder grown in that soil. Therefore, the iodine concentration in abiotic samples gets paramount importance.

In the present study, soil, water and feed/fodder had less than normal iodine concentration in most of the places under study area. Many workers have recorded high incidence of goitre due to low level of iodine in soil, water and feed/fodder (Mee, 1993; Ghergariu *et al.*, 1994; Tsuneyoshi *et al.*, 1995; Bires *et al.*, 1996; Henze *et al.*, 1997; Kursa *et al.*, 1998 and Singh *et al.*, 2002). Ramalingaswami *et al.* (1961) in their study in Sub Himalayan region, observed extremely low value of iodine in drinking water. Dudani *et al.* (1978) reported iodine concentration of water as 1.6-1.8 µg/l where goitre prevalence was 0.83-32.50%. Agarwal *et al.* (1987) during a study in Gangetic belt noticed concentration of iodine as 1.52 ± 0.38 µg/l in drinking water and 1.46 ± 0.93 ppm in soil with 25.5% prevalence of goitre. However, iodine deficiency in non-biological samples is not the only single most reason for high incidence of goitre. Presence of goitrogen substances in feed-fodder, interaction of certain other minerals such as selenium, calcium and magnesium with that of iodine (Januszko, 1981) and certain factors which

directly or indirectly becomes a cause of iodine deficiency is all important, while interpreting a case of goitre. If intake of goitrogen substances becomes more than 30% of diet, then requirement of iodine increases to double, which could have been additional reason and normal iodine demand could have not fulfilled.

There was significant decrease in $T_3$, $T_4$ and increase in TSH levels in goitrous goats compared to normal goats of study area. Similar findings of $T_3$ and $T_4$ values were also recorded by Raheja and Linscheer, (1979), Mano *et al.* (1985), Reddy *et al.* (1996), Toda *et al.* (2001) and Singh (2001) in various species of clinical and induced goitrous animals. Significant decrease in thyroid hormone in goitre affected animals could be due to severe iodine deficiency. Takahashi *et al.* (2001) found lowered serum $T_4$ levels in calves with endemic goitre tended to be lower than those of healthy ones and $T_3$ levels of calves with goitre were similar to those of healthy ones. The reduction in both $T_4$ and $T_3$ hormones was due to decreased bioavailability of iodine from different sources of intake (Hetzel, 1991). However, disorders in the synthesis, storage and secretion of thyroid hormones provide the molecular basis of abnormalities in the thyroid growth or thyroid dishormonogenesis which results in congenital hypothyroidism (Vijender, 2003).

It was concluded that the overall prevalence of goitre was 58.23% (36.15% – 69.04%) in 13 districts of U.P. and Uttarakhand. Low concentration of iodine in non-biological materiats has been found the cause of high prevalence of goitre in the study areas. There was decrease in $T_3$, $T_4$ and increase in TSH levels in goitrous goats compared to normal goats of study area.

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# Comparative efficacy of some oral supportive therapies in calf diarrhoea

*N. Chand[1], N.N. Pandey[2] and D.B. Mondal[3]*
Division of Medicine, Indian Veterinary Research Institute, Izatnagar-243122, U.P.

## Abstract

Twenty four crossbred calves suffering from E.Coli diarrhoea were randomly divided into four groups I, II, III and IV each consisting of 6 calves for trial of four oral supportive therapies. Animals of group I were given oral electrolyte solution with high energy and glutamine (OESHEG). Group II animals received combination of Bel fruit powder and Shisham leaves powder. Group III received Glucose along with Bel and Shisham while calves of group IV were given combination of Bel, Shisham, Glucose and Glutamine. OESHEG containing Na-150, K-20, Cl-140, HCo3-30, Dextrose-300 and Glutamine-30 mmol/lit was used @ 1lit/calf twice daily. In the above combinations Bel and Shisham were used @ 2.4g/10kg b wt,10g/10kg b wt twice daily respectively. Glucose and glutamine were given@300mmol and 30mmol twice daily respectively in these combinations. All the supportive therapies were used along with cotrimazine @15mg/kg b wt as specific antibacterial therapy. The treatment was continued for three days. The efficacy of oral formulation containing bel + shisham + Glucose + Glutamine was found very close to OESHEG followed by combinations of bel +shisham + Glucose and bel + shisham in decreasing order of efficacy.

**Key words:** Bel, *Calves*, Diarrhoea, *E. coli*, Shisham

Diarrhoea in calves is one of the most important conditions for the dairy industry. As regards various causes of diarrhoea in calves *Escherichia coli* (*E. coli*) is the most common cause of diarrhoea in calves up to 4 month of age. There are number of indigenous preparations to treat the cases of calf diarrhoea, which are used in rural India since long with encouraging results. Shisham leaf powder and bel fruit powder separately has been found effective in mild to moderate cases of calf diarrhoea (Sena *et al.*, 2005). This study was taken to evaluate the therapeutic efficacy of bel and shisham in combination and with supplemental energy (glucose) and nutrient support (glutamine).

## Materials and Methods

Twenty four (24) crossbred calves of either sex aged up to three months maintained at livestock production and research (cattle &buffalo) unit of the institute and suffering from *E. coli* diarrhoea were selected for this study. They were randomly divided into four groups I, II, III and IV each consisting of 6 calves.

**Treatment**: Animals of group I received oral electrolyte solution with high energy and glutamine (OESHEG) @1lit/calf bid. This was constituted in the laboratory with composition per litre Na-150, K-20, Cl-140, $HCo_3$-30, Dextrose-300 and glutamine-30mmol. Animals of group II were given combination of bel fruit powder and shisham leaf powder. Group III animals received glucose along with bel and shisham while group IV animals were supplemented with the combination of bel, shisham, glucose and glutamine.

The unripe bel fruit was cut into slices and dried under the shade. This was made to powder for trial @24g/10kg b wt bid. Shisham leaves were freshly plucked, dried under the shade and made to powder for trial@10g/10kg b wt bid. Glucose and glutamine were given @ 300mmol and 30 mmol bid respectively in these combinations. All the four combinations were evaluated for their therapeutic efficacies along with cotrimazine(Sulphamethoxazole+ Trimethoprim)@15mg/kg b wt bid. Cotrimazine was selected on the basis of cultural sensitivity test of faecal isolates. The therapy was continued for three days.

**Clinical profile:** The clinical symptoms like body temperature, appetite, color of faeces etc. of the diarrheic calves were noted. The scores (0-3) for faecal consistency, dehydration and depression of each calf were recorded on day 0(before therapy) and day 3 and day 7(after therapy) as per Walker *et al.*, 1998.

**Sample collection and hematobiochemical profile**: Approximately 0.5 ml of whole blood was collected in heparinized syringe anaerobically and kept in ice for blood gas analysis. Five ml of blood was collected in glass test tubes and processed for separation of serum for biochemical analysis. Blood was collected on day 0(before treatment) and subsequent to start of

[1]Assistant Professor, Department of Clinical Vety. Medicine E. &J., GADVASU, Ludhiana, [2]Head, Deptt of Clinical Medicine, COVS, CAU, Imphal, [3]Senior Scientist, Division of Medicine, IVRI, Izatnagar

treatment on day 3 and day 7. Packed cell volume (PCV), glucose were determined as per method suggested by Coles, 1980. Sodium and potassium were estimated by flame photometry. Samples for blood pH, $HCo_3$ were analyzed by use of a blood gas analyzer (Stat Profile-M).

The data were statistically analized using ANOVA to find the significance of difference between the mean values of different groups (Snedecor and Cochran, 1994).

**Results and Discussion**

The calves suffered with mild to moderate diarrhoea with presence of semisolid to watery offensive faeces. The calves were found dull and depressed. Most of the calves suffered with reduced appetite. The color of the diarrheic faeces was yellowish white to green. The diarrheic calves were found free from parasitic infection based on laboratory examination of faecal samples. This may be due to routine preventive deworming schedule being practiced at the farm. Cultural examination of all the diarrheic calves revealed the presence of *E.coli* as evident from metallic sheen on eosine methylene blue media, which was subsequently confirmed by biochemical tests.

The clinical profile of diarrheic calves has been given in table1. The rectal temperature of calves of all the groups remained in the normal range ($100.86\pm0.183^0F$ to $102.08\pm0.382^0F$) throughout observation period. The comparative evaluation of results obtained in respect to scores of faecal consistency, similar response was observed on day 3 post therapy in all the four groups with the value becoming normal. As regards improvement in the dehydration and depression score of the diarrheic calves, highest improvement was observed in group I on day 3 post therapy followed by group IV, III and II animals. However on $7^{th}$ day after therapy calves of all the groups showed full clinical recovery.

In respect of PCV, better improvement towards normal was observed in group I followed by group IV, III and II on day 3 post therapy. As regards changes in serum glucose similar improvement was observed in group I and IV, which was the maximum, followed by group III and II on day 3 after therapy. However, on $7^{th}$ day, the performance of group I, III and IV was found comparable to each other and significantly ($p<0.05$) less improvement was observed in group II animals. In respect of changes in value of serum sodium and potassium, significantly ($p<0.05$) better improvement was observed in group I followed by group IV, III and II on day 3 of therapy. The value of serum sodium and potassium became similar in all the groups, $7^{th}$ day post therapy. As regards changes in blood pH and $HCo_3$ values, group I calves revealed better recovery towards normal in these parameters than group II, III and IV on day 3 of therapy while on day 7 of

**Table 1:** Clinical profile of experimental calves

| Parameter | Group | Days of therapy | | |
|---|---|---|---|---|
| | | 0 | 3 | 7 |
| Faecal consistency Score (0-3) | Gr. I | $2.33\pm0.21^{Aa}$ | $0.00\pm0.00^{B}$ | $0.00\pm0.00^{B}$ |
| | Gr. II | $2.66\pm0.21^{Aa}$ | $0.00\pm0.00^{B}$ | $0.00\pm0.00^{B}$ |
| | Gr. III | $2.50\pm0.22^{Aa}$ | $0.00\pm0.00^{B}$ | $0.00\pm0.00^{B}$ |
| | Gr. IV | $2.16\pm0.22^{Aa}$ | $0.00\pm0.00^{B}$ | $0.00\pm0.00^{B}$ |
| Dehydration Score (0-3) | Gr. I | $1.83\pm0.16^{Aa}$ | $0.00\pm0.00^{Ba}$ | $0.00\pm0.00^{B}$ |
| | Gr. II | $2.00\pm0.25^{Aa}$ | $0.83\pm0.16^{Bb}$ | $0.00\pm0.00^{C}$ |
| | Gr. III | $2.16\pm0.16^{Aa}$ | $0.67\pm0.21^{Bb}$ | $0.00\pm0.00^{C}$ |
| | Gr. IV | $2.33\pm0.21^{Aa}$ | $0.16\pm0.16^{Ba}$ | $0.00\pm0.00^{B}$ |
| Depression Score (0-3) | Gr. I | $1.67\pm0.21^{Aa}$ | $0.00+0.00^{Ba}$ | $0.00\pm0.00^{B}$ |
| | Gr. II | $1.83\pm0.30^{Aa}$ | $0.83\pm0.21^{Bb}$ | $0.00\pm0.00^{C}$ |
| | Gr. III | $2.00\pm0.36^{Aa}$ | $0.33\pm0.21^{Ba}$ | $0.00\pm0.00^{B}$ |
| | Gr. IV | $2.00\pm0.25^{Aa}$ | $0.16\pm0.16^{Ba}$ | $0.00\pm0.00^{B}$ |

The observation with different small letters in a column and different capital letters in a row as superscript differ significantly ($P<0.05$)

Gr. I - Treated with oral cotrimazine + oral electrolyte solution with high energy and glutamine
Gr. II - Treated with oral cotrimazine + beI + shisham
Gr. III - Treated with oral cotrimazine + bel + shisham + glucose
Gr. IV - Treated with oral cotrimazine + beI + shisham + glucose + glutamine

**Table 2:** Haemato-biochemical profile of diarrhoeic calves

| Parameter | Group | Days of therapy | | |
|---|---|---|---|---|
| | | 0 | 3 | 7 |
| PCV (%) | Gr. I | 43.16±1.07$^{Aa}$ | 35.83±0.87$^{Ba}$ | 33.33±1.20$^{Ba}$ |
| | Gr. II | 44.33±0.76 $^{Aa}$ | 33.16±0.79$^{Bb}$ | 35.16±1.10$^{Ca}$ |
| | Gr. III | 42.33±0.42 $^{Aa}$ | 38.16±1.19$^{Bb}$ | 34.33±0.66$^{Ca}$ |
| | Gr. IV | 44.33±0.66$^{Aa}$ | 35.50±0.71$^{Ba}$ | 33.16±0.70$^{Ca}$ |
| Glucose (mg/dl) | Gr. I | 44.89±1.10$^{Aa}$ | 60.22±0.41$^{Ba}$ | 62.47±0.80$^{Ba}$ |
| | Gr. II | 44.61±0.98$^{Aa}$ | 51.89±0.98$^{Bb}$ | 53.54±1.01$^{Bb}$ |
| | Gr. III | 46.59±0.97$^{Aa}$ | 56.95±0.95$^{Bc}$ | 60.44±1.09$^{Ca}$ |
| | Gr. IV | 43.46±0.64$^{Aa}$ | 59.63±0.78$^{Ba}$ | 61.09±1.88$^{Ba}$ |
| Sodium (mmol/L | Gr. I | 115.67±1.08$^{Aa}$ | 129.33+0.88$^{Ba}$ | 130.33±1.38$^{Ba}$ |
| | Gr. II | 117.66±1.05$^{Aa}$ | 122.83±0.47$^{Bb}$ | 128.16±1.32$^{Ca}$ |
| | Gr. III | 118.66±1.08$^{Aa}$ | 125.83±0.91$^{Bb}$ | 128.83±0.47$^{Ca}$ |
| | Gr. IV | 117.50±0.80$^{Aa}$ | 126.50±1.20$^{Bc}$ | 129.66±1.20$^{Ba}$ |
| Potassium (mmol/L) | Gr. I | 5.26±0.16$^{Aa}$ | 4.23±0.07$^{Ba}$ | 4.20±0.03$^{Bab}$ |
| | Gr. II | 5.15±0.11$^{Aa}$ | 4.85±0.12$^{ABb}$ | 4.55±0.11$^{Bb}$ |
| | Gr. III | 5.10±0.08$^{Aa}$ | 4.73±0.11$^{Abc}$ | 4.21±0.18$^{Bab}$ |
| | Gr. IV | 4.86±0.17$^{Aa}$ | 4.48±0.11A$^{Bac}$ | 4.10±0.10$^{Ba}$ |
| Ph | Gr. I | 7.230±0.018$^{Aa}$ | 7.380±0.005$^{Ba}$ | 7.400±0.003$^{Ba}$ |
| | Gr. II | 7.270±0.011$^{Aa}$ | 7.300±0.005$^{Bb}$ | 7.340±0.008$^{Cb}$ |
| | Gr. III | 7.240±0.007$^{Aab}$ | 7.320±0.012$^{Bb}$ | 7.350±0.003$^{Cb}$ |
| | Gr. IV | 7.250±0.008$^{Aab}$ | 7.300±0.010$^{Bb}$ | 7.380±0.008$^{Ca}$ |
| HCO3 (mmol/L) | Gr. I | 17.93±0.38$^{Aa}$ | 24.80±0.74$^{Ba}$ | 27.43±0.40$^{Ca}$ |
| | Gr. II | 18.18±0.33$^{Aa}$ | 20.98±0.19$^{Bb}$ | 24.86±0.21$^{Cb}$ |
| | Gr. III | 18.36±0.47$^{Aa}$ | 21.12±0.14$^{Bb}$ | 24.86±0.43$^{Cb}$ |
| | Gr. IV | 17.78±0.37$^{Aa}$ | 22.00±0.39$^{Bb}$ | 27.060±0.80$^{Ca}$ |

The observation with different small letters in a column and different capital letters in a row as superscript differ significantly (P<0.05)

Gr. I - Treated with oral cotrimazine + oral electrolyte solution with high energy and glutamine

Gr. II - Treated with oral cotrimazine + beI + shisham

Gr. III - Treated with oral cotrimazine + bel + shisham + glucose

Gr. IV - Treated with oral cotrimazine + beI + shisham + glucose + glutamine

therapy improvement in these parameters were similar in group I and IV that was maximum followed by group III and II which registered similar increase (Table 2).

In this study, the use of OESHEG yielded comparatively faster clinical and biochemical recovery because it contains the necessary element i.e. sodium, potassium, chloride, bicarbonate, dextrose and glutamine to correct the secondary complications of dehydration, electrolyte and acid base imbalances associated with diarrhoea. The fluid loss in diarrhoea is principally extra cellular and initially the ions lost through the intestinal lumen are sodium and chloride. The hyperkalaemia seen in association with diarrhoea is mainly attributable to the shift of $K^+$ from intracellular to extra cellular compartment under the influence of metabolic acidosis (Michell *et al.*, 1989). This shows that in case of diarrhoea the patient suffers from hypokalaemia in terms of body's total potassium content. Therefore replacement of all these ions as quickly as possible is required. The OESHEG had the potential to correct electrolyte and acid base imbalances associated with diarrhoea.

In the present study, incorporation of 300mmol/L glucose in group I, III and IV found better in terms of improvement in depression by providing more energy to ailing calves in comparison to group II calves on 3$^{rd}$ day of therapy. Findings of the study are in accordance with earlier reports of Brooks *et al.* (1997) and Sena *et al.* (2005). In this study the addition of glutamine @30mmol/L in group I (OESHEG) and IV (bel+shisham+glucose+glutamine) was found beneficial because the therapeutic efficacy of group I and IV drug regimen were statistically similar in terms of improvement in many parameters like dehydration, PCV, glucose on day 3 after therapy while comparatively less improvement in these parameters were observed in group III and II calves which were not given glutamine. Glutamine is the main nucleotide precursor for intestinal

cells. It promotes intestinal absorption of sodium, hepatic uptake of glucose and helps in sustaining villous form and function (Vanderhulst *et al.,* 1993).

The combination therapy of bel+shisham (group II) also yielded good results. The efficacy of bel+shisham was found comparable to other groups on 7th day of therapy however on day 3 it was found to be less than other oral therapies. The effectiveness of shisham leaves in diarrhoea could be due to its nonspecific spasmolytic activity (Kumar *et al.*, 2000). Sarg *et al.* (1999) indicated that the alcoholic extract of green branches of aerial parts (leaf) of shisham had a dose dependent inhibitory effect on the motility of isolated rabbit duodenum. Sena *et al.* (2005) observed that powder of shisham leaves is effective in checking diarrhoea @ 105g/100kg b wt bid for 3 days. This marked astringent property could be due to high tannin content of leaves.

The unripe fruit of bel is known to be used for antidiarrhoeal effect (Dukes *et al.,* 2000; Nadkarni, 2000; Sena *et al.*, 2005). Dukes *et al.* (2000) observed that unripe bel fruit possessed antibacterial, antispasmodic, demulcent, antiviral activities and used in diarrhoea, dysentery and *E.coli* infection in human beings. The fruit pulp of bel contains reducing sugar, tannin, furocoumarin (marmelosin) as the active ingredient (Nadkarni, 2000). Sena *et al.* (2005) observed that bel fruit powder @24g/100kg b wt bid for three days was effective as primary therapeutic agent in nonspecific diarrhoea.

Findings of present study conclude that oral electrolyte solution with high energy and glutamine is the most effective supportive therapy in mild to moderate calf diarrhoea. The efficacy of oral formulation containing bel + shisham + Glucose + Glutamine was found very close to OESHEG followed by combinations of bel +shisham + Glucose and bel + shisham in decreasing order of efficacy. These herbal preparations are easily available and cost effective and therefore, can serve as suitable alternative for OESHEG. Further research aiming at isolation and characterization of ingredient with antidiarrheal action in these herbs is needed for their commercial utilization at large scale.

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# Mineral status in cattle of Aizawl district of Mizoram

*K. Sarma[1] G. Kalita[2], K.C. Das[3], A. Ali[4], G. Das[1], R. Buragohai[5] and B. Saikia[6]*
College of Veterinary Sciences and Animal Husbandry,
Central Agricultural University, Selesih, Aizawl-796 014, Mizoram, India

## Abstract

A survey on cattle rearing in Aizawl district of Mizoram revealed that the farmers keep their animals in confinement with or without mineral supplementation. The mean serum Ca (mg/dl), P (mg/dl) and Mg (mg/dl) of the cattle were 7.68± 0.46, 3.59±0.03 and 2.30±0.01 respectively, whereas trace mineral content like Cu (ppm), Zn (ppm) and Fe (ppm) were 0.40±0.03, 0.58±0.12 and 3.35±0.12 respectively. It was also observed that mineral deficiency related diseases were common problem in Aizawl district of Mizoram. Ca and P level was lower in soil, fodder and serum whereas Cu (0.40±0.03 ppm) and Zn (0.58±0.12 ppm) level was lower only in serum.

**Key words:** Mineral deficiency disease, cattle, blood serum mineral status

Serum mineral concentration provides an indication of mineral intake in the grazing animals (Underwood 1981). The requirements for various micronutrients vary with the physiological status of the animals (Ghosh *et al,*. 1992; Haldar *et al.*, 1995). Deficiency of both macro and micronutrients causes impairment of both productive and reproductive function (Corah, 1996). It is therefore, necessary to know the mineral status of animals. However, the system of surveillance and monitoring of mineral deficiency disorders in livestock does not exist in many parts of India including Mizoram. Mizoram is a hilly state of northeastern region, lying between 21.85°N latitude and 92.15° to 93.29°E longitude and receives more than 200 cm annual rainfall, which is very high in comparison to other parts of the country. Heavy rainfall causes leaching of soils all over the Mizoram causing deficiency of several minerals in the soil. In Mizoram, farmers generally do not supplement mineral mixture in animal ration, which possibly leads to many reproductive and mineral deficiency disorders like anoestrus, delayed puberty, repeat breading and post parturient haemoglobinuria. Keeping these points in view, an attempt was made to assess the mineral status cattle in Aizawl district of Mizoram.

## Materials and Methods

A survey was conduct among 200 farmers from ten different villages in Aizawl district of Mizoram. A standard questionnaire was prepared to collect required information from livestock owner such as managemental practices, sources of fodder, housing system, sources of water, practices of mineral mixture feeding and history of the mineral deficiency related disease etc. The information on mineral deficiency related diseases was also collected from Department of Animal Husbandry, Aizawl district, Mizoram from June' 2004- December' 2005.

One hundred (100) cross bred cattle, between 1st to 3rd lactation with milk yield between 5-6 lits/day were randomly selected for this study. Harvested serum samples were stored at -20°C for further use. The digestion of serums was done as per the method of Kolmer *et al.* (1951). From each site, fodders (500 gm each) which were being fed to animals by their owners were collected following random sampling technique and processed as per the method of Trolson (1969) for analysis. Soil samples were also collected (100 gm) from the same area mentioned above and processed as per the method of Franeck (1992). The pH of soil was also recorded. All the processed samples were analyzed for Ca, Mg, Cu, Fe, and Zn by atomic absorption spectrophotometer (AAS-200, Perkinelmer, Netherland). Phosphorus was determined by the method described by Talapatra *et al.* (1940) method.

The mean and standard errors of the data were analyzed as per standard statistical procedure (Snedecor & Cochran, 1994).

## Results and Discussion

The mean Ca, P and Mg in the blood serum

[1]Assistant Professor, Dept. of Veterinary Clinical Medicine, [2]Assistant Professor, Dept.of Livestock Production & Management, [3]Senior Scientist, NRC, Mithun, Jarnapani, Dimapur, Nagaland, [4]Associated Professor, Dept. of Veterinary Biochemestry [5]Assistant Professor, Dept. of Animal Nutrition, [6]Assistant professor, Dept. of Vety. Surgery & Radiology

of the cattle were 7.68± 0.46 mg/dl, 3.59±0.03mg/dl and 2.30±0.01mg/dl respectively, whereas, trace mineral content like Cu (ppm) Zn, (ppm) and Fe (ppm) were 0.40±0.03, 0.58±0.12 and 3.35±0.12 respectively. The findings of the study are in agreement with the observation made by Gowda *et al.* (2002), Biswas *et al.* (2002) and Sharma *et al.* (2004).

The common mineral deficiency related diseases were repeat breeding (62%), anestrus (52%), Prolapse (36%), delayed puberty (2.08±0.01 years), post parturient haemoglobinuria (36%) and magnesium tetany (20%) (Fig. 1). Most of the mizo farmers were dependent on forest fodder, which are deficient in minerals (Sarma, 2005) as a source of feed material to their animal, because in Aizawl, cultivated land for fodder is very limited. The mineral deficiency which has been noticed in the surveyed area, could be attributed to the climatic conditions, acidic PH and type of fodders used.

Low serum Calcium (Ca) and Phosphorus (P) in cattle attributed to low dietary intake and extensive drainage of both these elements through milk. Lower levels of both the elements were also recorded in fodder as well as in soil. Sarma (2005) also reported lower level of soil Ca (0.154 ± 0.018%) and P (0.082± 0.007%) as well as fodder Ca (1.665± 0.210%) and fodder P (0.244± 0.005%) from Aizawl district. Deficiency of P in soil, fodder and serum, might have caused post-parturient haemoglobinuria, delayed puberty and delays sexual maturity, which might be due to the inhibition of function of anterior pituitary resulting in the suppression of both ovarian and genital activity (Sharma *et al.*, 2004). Prolapse (uterine/vaginal) might have caused due to deficiency of Ca which is the essential element for muscle contraction and muscle tonicity.

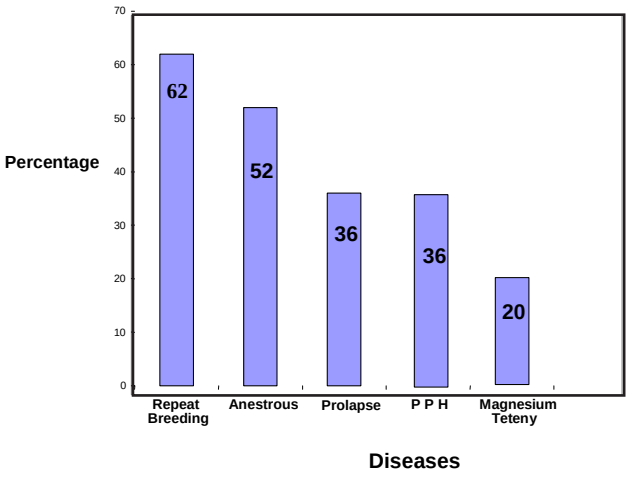


**Fig. 1:** Mineral Deficiency Related Diseases of Cattle in Aizwal District

The lower levels of serum Cu (0.40±0.03 ppm) and Zn (0.58±0.12 ppm) were recorded (normal level of Cu- 0.6-1.5ppm and Zn- 1-2ppm) whereas the serum Fe level (3.35±0.12 ppm) was above the normal level (normal level 1-2 ppm). Role of trace minerals like Cu and Zn in maintaining reproductive rhythm is well documented, as they are specific activators of enzyme system responsible for it (Mc.Dowell *et al.*, 1984). Zn plays a critical role in the development of the germinal cells and its deficiency causes failure of to fail the reproductive processes leading to repeat breeding, anoestrus, delayed puberty etc. (Das *et al.*, 2002).

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**Table 1:** Mineral Status of Blood Serum of Cattle in Aizawl District

| Area | Ca (mg/dl) | P (mg/dl) | Mg mg/dl) | Cu (ppm) | Zn (ppm) | Fe(ppm) |
|---|---|---|---|---|---|---|
| Khatla South | 7.46 ± 0.41 | 3.61 ± 0.05 | 2.03 ± 0.16 | 0.45 ± 0.05 | 0.65 ± 0.07 | 3.47 ± 0.15 |
| Ramthar | 8.46 ± 0.46 | 3.63 ± 0.05 | 2.12 ± 0.12 | 0.36 ± 0.04 | 0.53 ± 0.05 | 3.48 ± 0.11 |
| Bungkawn | 7.82 ± 0.50 | 3.85 ± 0.01 | 2.15 ± 0.16 | 0.37 ± 0.05 | 0.57 ± 0.81 | 3.56 ± 0.16 |
| Mission V.T | 6.85 ± 0.51 | 3.75 ± 0.01 | 2.45 ± 0.06 | 0.28 ± 0.03 | 0.56 ± 0.01 | 2.98 ± 0.10 |
| Durtlang | 7.37 ± 0.35 | 3.76 ± 0.05 | 2.51 ± 0.11 | 0.35 ± 0.01 | 0.73 ± 0.03 | 3.46 ± 0.10 |
| Sihphir | 7.41 ± 0.46 | 3.63 ± 0.03 | 2.56 ± 0.15 | 0.45 ± 0.03 | 0.75 ± 0.05 | 3.45 ± 0.10 |
| Selesih | 8.31 ± 0.45 | 3.73 ± 0.05 | 2.32 ± 0.11 | 0.43 ± 0.01 | 0.65 ± 0.03 | 3.46 ± 0.15 |
| Zonuam | 8.36 ± 0.46 | 3.12 ± 0.01 | 2.23 ± 0.01 | 0.37 ± 0.03 | 0.63 ± 0.05 | 3.27 ± 0.13 |
| Chawlhhmun | 7.46 ± 0.50 | 3.36 ± 0.05 | 2.46 ± 0.05 | 0.46 ± 0.05 | 0.05 ± 0.03 | 3.18 ± 0.15 |
| Thuampui | 7.32 ± 0.50 | 3.45 ± 0.01 | 2.13 ± 0.03 | 0.43 ± 0.03 | 0.71 ± 0.04 | 3.16 ± 0.06 |
| Over All Mean | 7.68 ± 0.46 | 3.59 ± 0.03 | 2.30 ± 0.01 | 0.40 ± 0.03 | 0.58 ± 0.12 | 3.35 ± 0.12 |

* Number of samples collected from each area =10Nos

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# Prevalence of *Cryptosporidium* infection in bovine calves in Botswana

*S.P. Sharma, L.M. Dambe and J.B. Machete*
Department of Animal Science and Production, Botswana College of Agriculture
Private Bag 0027, Gaborone, Botswana

## Abstract

Faecal samples of 431 calves <3 months from 11 dairy and seven beef farms were examined by EIA and MZN staining technique. Mean infection rates in calves were 24.8 and 19% using EIA and MZN, respectively. Prevalence rate was significantly higher in dairy than beef calves ($P < 0.05$). Increased infection rates were observed in dairy (37.7%) and beef (26.4%) animals aging < 4 weeks compared to > 4-12 weeks-old (18.6 and 10.7%). High mortality and case fatality rates of 26.6% (n=218) and 39.2% (n=74) were recorded in *Cryptosporidium* infected calves aging between 2 and 30 days, respectively. EIA was more sensitive than MZN in detecting coproantigen in both dairy (28.7% and 17.9%) and beef calves (21.8 and 14.1%). Diarrhoeic animals passing liquid to soft excrements demonstrated significantly higher rate of infection than those with solid faeces ($P< 0.01$). Sixteen of 18 farms harboured one or more infected animals. Six soil (5.8%) and seven water samples (13%) were positive for *Cryptosporidium* oocysts. A positive association was observed between presence of oocysts in soil samples having neutral to alkaline pH with 51 to 55% moisture contents in comparison to those with acidic pH and < 50% moisture contents. Calves, manures and water runoffs from dairy farms may be considered potential risks of public water supply contamination.

**Keywords:** Cattle, Cryptosporidiosis, Immunoassay, Prevalence.

Cyptosporidiosis has become increasingly important over the past decade causing acute diarrhoea in neonatal ruminants worldwide (de la Fuente *et al.*, 1999; Castro-Hermida *et al.*, 2002). Of different *Cryptosporidium* sp., *C. parvum* "bovine genotype" found in ruminants is zoonotic and causes life-threatening diarrhoea in HIV/AIDS infected persons, immuno- compromised individuals and young children. Its prevalence is affected by age groups and managemental practices in different countries (Santín *et al.*, 2004; Geurden *et al.*, 2006; Swai *et al.*, 2007). In Botswana, its zoonotic potential is substantial considering deaths of over 500 children in 2006 caused by consumption of water contaminated by *Cryptosporidium* oocysts and *Escherichia coli* organisms (Anonymous, 2007), and fairly high cryptosporidial infection rates in animals (Sharma, 2006; Sharma and Machete, 2009). The present study was aimed to record prevalence of *Cryptosporidium* infection in dairy and beef calves < 3 months from livestock farms located in southern Botswana and possible role of animals in environmental contamination to the public water supply system.

## Material and Methods

This investigation was conducted on 18 cattle farms (11 dairy, 6 beef and 1 mixed) managed under intensive, semi-intensive, and extensive or communal or traditional system. Faecal samples (10-15 g) were collected per rectum from 275 dairy and 156 beef calves of 3 months and below between September 2009 and March 2010 twice at an interval of 33 to 40 days. All the calves of selected farms were sampled because of their relatively small numbers. The consistency of each faecal sample (liquid, soft and solid) was also recorded. Total 103 soil and 54 water samples were collected. Holding areas for young animals, drainage, vegetations, grasses, flooding and stock density were recorded. All the samples were transported on ice and kept at 4°C till processing.

The faecal, soil and water sample smears were fixed with methanol, stained with Modified Ziehl-Neelsen stain (MZN) and examined for *Cryptosporidium* sp. oocysts (Garcia, 2001). Morphologically, smaller (4.0-4.5 ìm x 4.0- 4.5 ìm) and larger (5.6-6.5 ìm x 6.6-7.0 ìm) oocysts were recorded as those of *C. parvum* and *C. andersoni*, respectively. *C. parvum* coproantigen was detected using EIA kits (Ridascreen® Cryptosporidium R-Biopharm, Darmstadt, Germany) as per procedure described by the manufacturer. Percent moisture and pH in soil samples were determined using standard methods. The results were analysed by Chi-square test and considered significant at $P < 0.05$.

## Results and Discussion

*Cryptosporidium* infection rates were 28.7

and 21.8% in dairy calves and 17.9 and 14.1% in beef calves as recorded by EIA and MZN staining technique, respectively (Table 1). Singh *et al.* (2006) and Swai *et al.* (2007) also recorded similar findings from India and Tanzania, respectively. In our investigation lack of multiple sampling on alternate days, intermittent shedding of *Cryptosporidium* oocysts and possibly non-detection of animals excreting a few oocysts might have underestimated the prevalence of infection. Major reasons for higher infection rates observed on dairy farms were on account of bad management practices like greater calf to calf contacts, increased stocking densities and poor sanitary conditions in calf pens. This has resulted into the increased levels of environmental contamination by *Cryptosporidium* oocysts excreted by infected animals in a limited area. Greater calf to calf contacts prompted them to lick stool smudged hair coats and perineal regions of each other. Lower infection rate recorded in beef calves was due to extensive management systems where there are less chances of convergence of large number of *Cryptosporidium* oocysts over a wider area in conjunction as well as less stocking densities at these farms. Due to non-availability of vaccine, it is necessary to educate cattle owners about good farm management practices, epidemiology and zoonotic potential of cryptosporidial infection.

Of 431 animals tested by EIA and MZN, 68 and 324 were found positive and negative by both methods, respectively. EIA could detect *Cryptosporidium* coproantigen in 39 animals more than MZN; the letter had 12 false positive results using the ELISA as standard reference. Goma (2005) stated that lower sensitivity of MZN was possibly on account of not employing concentration step on the faecal specimens prior to their microscopic examination. The sensitivities of commercial enzyme immuno-assays have been reported to be higher in comparison to acid-fast staining techniques (Katanika *et al.*, 2001; Marks *et al.*, 2004). However, use of EIA diagnostic kits is somewhat restricted in clinical pathological laboratories of developing countries because of their high costs and prolonged delays in their procurment. Furthermore, the immunological detection methods can be problematic due to non-specificity of antibodies resulting from cross reactivity with other organisms (Fayer, 2004). All animals detected positive by MZN method

**Table 1.** Prevalence of *Cryptosporidium* infection in two age groups of dairy and beef calves

| Age Group | Number of Animals Tested | Number of Animals Positive | | % Prevalence ± S.E* | |
|---|---|---|---|---|---|
| | | EIA | MZN | EIA | MZN |
| Dairy < 4 weeks | 146 | 55 | 46 | 37.7 ± 4.0[a] | 31.5 ± 3.8[a] |
| Dairy 4- <12 weeks | 129 | 24 | 14 | 18.6 ± 3.4[b] | 10.9 ± 2.7[b] |
| Total | 275 | 79 | 60 | 28.7 ± 2.7 | 21.8 ± 2.5 |
| Beef< 4 weeks | 72 | 19 | 14 | 26.4 ± 5.2[c] | 19.4 ± 4.7 |
| Beef 4- <12 weeks | 84 | 9 | 8 | 10.7 ± 3.4[d] | 9.5 ± 3.2 |
| Total | 156 | 28 | 22 | 17.9 ± 3.1 | 14.1 ± 2.8 |
| Grand Total | 431 | 107 | 82 | 24.8 ± 2.0 | 19 ± 1.9 |

*Differences between infection rates in two age groups of dairy calves[a,b] were significant (P<0.05) by both EIA and MZN stain, but the differences in beef calves[cd] were significant (P<0.05) by EIA

**Table 2.** Prevalence of *Cryptosporidium parvum* infection in dairy and beef calves under intensive and semi-intensive management systems using Enzyme immunoassay and Modified Ziehl Neelsen staining technique

| Age Group | Number of Animals Tested | Number of Animals Positive | | % Prevalence ± S.E* | |
|---|---|---|---|---|---|
| | | EIA | MZN | EIA | MZN |
| **Dairy Calves** | | | | | |
| Intensive | 174 | 55 | 44 | 31.6 ± 3.5 | 25.3 ± 3.3 |
| Semi-intensive | 101 | 24 | 16 | 23.8 ± 4.2 | 15.8 ± 3.6 |
| Total | 275 | 79 | 60 | 28.7 ± 2.7 | 21.8 ± 2.5 |
| **Beef Calves** | | | | | |
| Semi-intensive | 37 | 8 | 7 | 21.6 ± 6.8 | 18.9 ± 6.4 |
| Extensive | 119 | 20 | 15 | 16.8 ± 3.4 | 12.6 ± 3.0 |
| Total | 156 | 28 | 22 | 17.9 ± 3.0 | 14.1± 2.8 |

demonstrated typical *C. parvum* oocysts with an exception of three calves (two beef and one dairy) that were passing distinctly larger oocysts indistinguishable from those of *C. andersoni*.

Higher infection was recorded in animals aging up to 4 weeks, after which there was a decline in the infection rates (Table 1). High mortality and case fatality rates recorded in 1 to 28 days-old calves were 26.6% (58/218) and 39.2% (29/74), respectively.The association between age and the infection rates as determined by EIA was significant in both dairy ($X^2$11.2, P< 0.01) and beef animals ($X^2$5.4, P< 0.05). This age related resistance observed in the current investigation corroborates the findings of Santin *et al.* (2004) and Geurden *et al.* (2006) who had shown majority of the infected dairy calves were 1 to 3 weeks old and shedding of oocysts peaked in the second week.

Mean prevalences of disease at intensive and semi-intensive managed dairy farms were 28.7 and 21.8% by ELISA and MZN, respectively. Of 156 beef calves, the infection rates were 16.8 and 21.6% among animals reared under extensive and semi-intensive managements by ELISA, respectively (Table 2). The infection rate was non-significantly lower in animals kept under semi-intensive and extensive husbandry systems. Santin *et al.* (2004) and Geurden *et al.* (2006) reported similar findings. Higher infection rates were observed at medium (41 to 100 animals) to large farms (more than 100 animals) than small farms (less than 40 animals). D-Rest Dairy Farm with more than 800 animals and constrained with problems of neonatal diarrhoea and calfhood mortality demonstrated maximum number of infected calves (38.9%, 49/ 126) excreting large number of *C. parvum* oocysts (1x $10^4$ to 1x$10^6$). In the present study, farm prevalence was 89% since all 11 dairy, one mixed farm and four of six beef farms were found harbouring one or more *Cryptosporidium* infected animals. No animal was found infected at Diphage and Matsimola beef farms.

A total of 93 dairy and 31 beef calves had diarrhoeic faeces with soft to liquid consistencies, of which 41 dairy (44.1%) and 10 beef (32.3%) animals were found infected. Thirty eight dairy (20.9%) and 18 beef (14.4%) calves excreting solid faeces were positive for *Cryptosporidium* antigen by EIA. Differences between two groups of calves having different faecal consistences were significant ( P< 0.01). Majority of the diarrhoeic calves (64 out of 93) were from the dairy farms; D-Rest Farm at Pitsane accounted for 67% of them and reported higher mortality in calves varying from 30 to 40% annually. It would be difficult to say wheather the calves that were positive with solid faeces were actually asymptomatic or had diarrhoea during earlier stages of infection and were in the process of recovery. It would also be pertinent to mention here that the farms under investigation were not sampled on the basis of existing scour problems. *C. parvum* has been recognised as one of the four top enteropathogens causing neonatal diarrhoea in calves worldwide; however, an association between shedding of oocysts and presence of diarrhoea has not always been seen (Faubert and Litvinsky, 2000; Castro-Hermida *et al.*, 2002). On adoption of hygienic measures during housing and feeding of calves, their oral rehydration and treatment with halofuginone lactate by the owner of D-Rest Farm, there was a substantial decline in cases of diarrhoea and reduction in calf mortality.

Of 103 soil and 54 water samples, 6 soil samples (5.8%) from three farms (D-Rest, Annadale and Dairy House) and 7 water samples (13%) from two farms (Crossy Park and Modipe) were positive for *C. parvum* oocysts. The oocysts were detected in those soil samples collected from holding and grazing areas on dairy farms. It may also be possible that these oocysts might have been shed by wildlife or other domestic animals. Average pH of the soil samples ranged from 6.5 to 8.9 and the mean gravimetric moisture content was 16% (3 to 55%). Robertson *et al.* (1992) and Brown *et al.* (1996) reported that *Cryptosporidium* oocysts were not able to survive low extremes of pH. However, Barwick *et al.* (2003) opined that the risk of detecting oocysts decreased in soil with increasing pH. There appeared to be a positive association between presence of *Cryptosporidium* oocysts in farm soil/ water samples from four farms(D-Rest, Annadale, Crossy Park and Dairy House) and increased infection rate of 36%. In some of the developing countries and in organic farming, farmyard manure is still being used as principal source of plant nutrients added to agricultural fields. Soil/manure from livestock farms and dairy farms in particular could be one of the important vehicles through which *Cryptosporidium* oocysts may travel into water sources and may even contaminate public water supply system. In addition to

animal sources, human sewage and mixed-source runoff attributable to rains might be playing a role in contaminating water.

Prevention and control of animal cryptosporidiosis like other enteric diseases lies in good management practices that include isolation of diarrhoeic from healthy animals, adoption of sanitary measures during housing and feeding and giving adequate quantities of colostrums to neonatal calves, and reduction in livestock stocking rates. These intervention strategies should be targeted at calves under 30 days old.

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# Macro mineral status in soil, fodder and serum of dairy cow in saline tract area of Akola district

*S.P. Waghmare, D.B. Sarode, A.Y. Kolte, N.P. Dakshinkar, S.G. Mode, S. H. Vyavahare and Namrata Babhulkar*
Department of Veterinary Clinical Medicine,
Post Graduate Institute of Veterinary and Animal Sciences, Akola-444104, Maharashtra.

**Abstract**

Total 104 soils, 71 fodders and 360 serum samples of lactating, pregnant, non-pregnant cows and heifers were collected from saline affected villages of Purna river valley of Akola district. and subjected for macro mineral estimation. The soil samples contained adequate amount of Ca, P, Mg, Na and K and thus no deficiency of these minerals was recorded in soil of this area. The Ca, P and Mg content of fodder of saline affected area were moderately low. The serum Ca and P level in lactating cows were found to be significantly lower than non-pregnant cows and heifers, whereas, serum Mg level in pregnant cows was found to be significantly low than non-pregnant, lactating cows and heifers. The study concluded that the fodder samples of this area shown deficiency of Ca, P and Mg whereas no deficiency of theses minerals recorded in soil samples. The lactating cows were deficient in Ca & P, suggesting supplementation of these minerals to meet the requirement.

**Keywords:** Dairy cows, fodder, macro minerals, saline tract area, serum, soil.

In Vidarbha region of Maharashtra State, the *Purna* river valley is the unique tract of vertisols having native salinity /sodicity, occupying the part of Amravati, Akola and Buldana districts of Vidarbha with an area of about 2.74 lakhs hector and spread in 547 villages. These soils have appreciable amount of $CaCO_3$ (Sagare *et al.*, 1991) which greatly immobilizes Ca and Mg in these soils and dominance of Na is increased which adversely affects the physical and chemical properties of soil. The ground water which is also alkali in nature makes the situation more problematic (Sagare *et al.*, 2000). It has been reported that the salinity of soil affects the crop yield and interferes the uptake of nutrients to the plants. The present study was therefore, undertaken to estimate the status of macro mineral in soil, fodder and serum of dairy cows as influenced by soil-plant animal relationship in saline tract area of Akola district.

## Materials and Methods

In the present study total seven villages from saline tract area of Akola district . viz. Gopalkhed, Gandhigram, Hata, Hingna-Tamaswadi, Karanja-Ramzanpur, Andura and Nimbhora were selected by adopting multistage stratified sampling technique. Total of 104 soil, 71 fodder and 360 serum samples from lactating, pregnant, non- pregnant cows and heifers were collected for laboratory analysis.

**Corresponding Author**: Dr. S.P. Waghmare, Department of Veterinary Medicine, P.G.I.V.A.S., Akola (MS), India

Soil pH was determined in soil suspension by digital pH meter (Jackson, 1979)**.** Soil Ca, Mg, Na and K were determined by method described by Jackson (1979). Available P was determined by Olsen's method (Olsen *et al.*, 1954). Fodder Ca and Mg were determined by EDTA-titrimetric method (Piper, 1966). Fodder P was estimated by Vanadomolybdate phosphoric acid yellow colour method (Jackson, 1979). Macro minerals in serum viz. Cu, P, Mg and Cl were estimated by using Autospan diagnostic kit on Serum Autoanalyser (Autochem- 2011). Serum Na and K were estimated by using flame photometer (Oser, 1979). Collected data was analyzed statistically as per the method described by Snedecor and Cochran (1994).

## Results and Discussion

The average macro-mineral concentrations with pH of the soil samples collected from 7 villages are given in Table 1. The average pH of soil samples of saline affected area ranged from 7.8 to 8.6 (8.2 ± 0.093), which tended to be higher, indicating that the soil of this region was very strongly alkaline in reaction. A high pH value could be attributed by virtue of sodium carbonate and carbonate mineral present in alkali soil (Nakeyama, 1970 and Sagare *et al.*, 2000).

The Ca, P, Mg, Na and K were 0.715±0.05, 0.223±0.008, 0.191±0.008, 0.039±0.004 and 0.031±0.004 percent respectively, in the soil of Purna river valley (Table 1). The observations are in

agreement with Babhulkar (1999) and Sagare *et al.* (2001) who also reported similar trend in saline affected area of Akola district. It is evident that as such no deficiency of Ca, P, Mg, Na and K was recorded in soil of all the villages of Purna river valley. Alkaline reactions and accumulation of salts in arid and semi arid climate of the valley resulted in high values of Ca and Mg followed by Na and K and high base saturation (Babhulkar, 1999).

The concentration of fodder Ca (%), P(%), Mg(%) were 0.467 ± 0.061, 0.199 ± 0.021, 0.204 ± 0.041, respectively, indicated low level of these minerals in fodder samples as compare to critical values (Table 1). The overall deficiency (%) of Ca, P and Mg, in fodder of saline affected villages were 12.68%, 12.68% and 15.49%, respectively. The results of the present study indicated that the status of various macro-minerals in soil may not reflect as much in fodders grown on these soils. The low level of macro minerals in fodder could be attributed to alkaline soil which might have interfere the uptake of mineral to the fodder (Reid and Horvath, 1980) and the high values of CEC (cation exchange capacity) of soil mainly ascribed to the imbalances in soil and forages thereby leads to such scenario in the study.

The serum Ca levels in lactating cows were found to be significantly lower than non-pregnant cows and heifers, whereas, the differences between lactating and pregnant cow remained non-significant. The serum Phosphorus levels in lactating cows were found to be significantly low as compared to the level recorded in pregnant, non-pregnant cows and heifers. The serum Mg level in pregnant cows were found to be significantly low than non-pregnant, lactating cows and heifers. These findings suggested that the mineral mixture containing adequate Mg needs to be incorporated to tackle the deficiency while during pregnancy. The serum sodium level in lactating cows were found to be significantly low than pregnant, non-pregnant cows and heifers. The serum potassium level in lactating cows found to be significantly higher than pregnant, non-pregnant cows and heifers. Serum chloride level in heifer was significantly higher than lactating cows, however, the differences amongst pregnant, non-pregnant cows and heifers were non-significant.

Correlation of coefficients of macro minerals in soil, fodder, serum of cows in saline affected area of Akola district has been depicted in Table 3. The correlation coefficient between animal-soil (Rxy), animal-fodder (Rxz) and soil-fodder (Ryz) for calcium, phosphorus and magnesium found statistically non-significant, however, the direction between correlation of animal- soil and soil-fodder found negative whereas correlation of animal and fodder in respect of Ca and P found to be positive indicating the direct association

**Table 1:** Soil and fodder macro mineral profile of saline affected area of Purna river valley of Akola district of Maharashtra State.

| Samples | No. of samples | pH | Ca (%) | P (%) | Mg (%) | Na (%) | K (%) |
|---|---|---|---|---|---|---|---|
| Critical values (Soil) Mc Dowell (1992) | | | 0.1 | 0.013 | 0.01 | 0.01 | 0.01 |
| **Soil** | 104 | 8.2±0.093 | 0.715±0.05 | 0.223±0.008 | 0.191±0.008 | 0.039±0.004 | 0.031± 0.004 |
| Critical values (Fodder) Mc Dowell (1992) | | | 0.3 | 0.25 | 0.20 | NA | NA |
| **Fodder** | 71 | Not done | 0.467 ± 0.061 (12.68) | 0.199 ± 0.021 (12.68) | 0.204 ±0.041 (15.49) | NA | NA |

(Values in parenthesis indicate deficiency in per cent)

**Table 2 :** Serum macro minerals in animals of different saline affected villages of Purna river valley of Akola district.

| S. N. | Elements | Lactating cows | Pregnant cows | Non-pregnant cows | Heifers | Pooled Mean | Critical values |
|---|---|---|---|---|---|---|---|
| 1 | Ca (mg/dl) | $8.965^{a}$ ± 0.293 | $9.321^{ac}$ ± 0.378 | $9.544^{bc}$ ± 0.289 | $9.828^{b}$ ± 0.445 | 9.372 ± 0.067 | < 8 mg % |
| 2 | P (mg/dl) | $4.019^{a}$ ± 0.123 | $4.439^{bc}$ ± 0.155 | $4.503^{b}$ ± 0.156 | $4.273^{c}$ ± 0.146 | 4.307 ± 0.03 | < 4 mg % |
| 3 | Mg (mg/dl) | $2.447^{2}$ ± 0.111 | $1.948^{1}$± 0.062 | $2.490^{2}$ ± 0.212 | $2.506^{2}$ ± 0.136 | 2.341 ± 0.015 | < 1.9 mg % |
| 4 | Na (mEq/l) | $139.857^{a}$ ± 0.926 | $143.719^{b}$ ± 1.479 | $144.368^{b}$ ± 1.221 | $143.970^{b}$ ± 1.612 | 142.859 ± 0.25 | < 130 mEq/L |
| 5 | K (mEq/l) | $4.556^{a}$ ± 0.271 | $4.255^{b}$ ± 0.086 | $4.245^{b}$± 0.079 | $4.198^{b}$ ± 0.095 | 4.328 ± 0.019 | <3.5 mEq/L |
| 6 | Cl (mEq/l) | $96.212^{a}$ ± 1.144 | $97.898^{ab}$ ± 1.520 | $97983^{b}$ ± 1.696 | $98.459^{b}$ ± 1.696 | 97.539 ± 0.25 | <95 mEq/L |

Means bearing same superscript do not differ significantly with each other within respective rows (P<0.01).

**Table 3:** Correlation coefficients of macro minerals of soil -fodder-serum of cows of saline affected villages of Purna valley of Akola district

| Sr. No. | Combination for correlation | Ca | P | Mg |
|---|---|---|---|---|
| 1 | Animal – Soil (Rxy) | $-0.07^{NS}$ | $-0.22^{NS}$ | $-0.37^{NS}$ |
| 2 | Animal fodder (Rxz) | $0.04^{NS}$ | $0.38^{NS}$ | $-0.31^{NS}$ |
| 3 | Soil-fodder (Ryz) | $-0.00^{NS}$ | $-0.11^{NS}$ | $-0.08^{NS}$ |

between fodder and animal as compared to indirect association between animal and soil. The multiple correlation coefficient [Rx(yz)] between animal, soil and fodder for Ca, P and Mg were found to be 0.08 , 0.42 and 0.51 respectively, indicating that there is a positive association between animal-soil - fodder irrespective of Ca, P and Mg content, however, the magnitude of correlation found to be statistically non-significant.

It is concluded that the soil of saline tract area of Akola district is adequate in macro minerals, whereas fodder samples of this area were deficient in Ca, P and Mg. The lactating and pregnant cows maintained in this area were deficient in Ca and P suggesting supplementation of these minerals to meet the requirments for optimum production of cows of this area.

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**Short Communication**

# Ultrasonographic studies of hepatic disorders and treatment in dogs*

*S.S. Tomar and Hemant Mehta*
Department of Veterinary Medicine,
College of Veterinary Science and Animal Husbandry, Mhow (M.P.)

## Abstract

Dogs suffering from hepatitis, hepatic cyst and hepatic tumor, revealed. anorexia, vomiting, diarrhoea, melena, icterus, dehydrated, polydypsia / polyurea and aneamia along with low Hb and PCV levels and high TLC and Neutrophils counts. ALT, globulin and serum bilirubin were significantly elevated while total protein, albumin and A:G ratio were significantly low. Ultrasonography showed diffuse hypo echoic liver parenchyma and hepatomegaly in hepatitis, normal or enlarged liver and distended gall bladder in cholecystitis , an anechoic, hypoechoic circumscribed mass in the liver and irregular contours of liver in hepatic cyst/ abscess, mixed echogenecity (hypoechoic and hyperechoic areas) with multiple hyperechoic nodules throughout the hepatic parenchyma and hepatomegaly in hepatic tumor.

**Keywords:** Dog, haemato-biochemical changes, liver, treatment, ultrasonography,

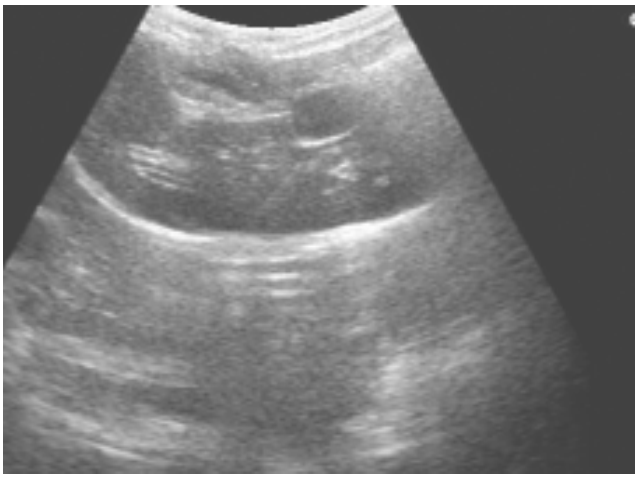
Ultrasound is one of the modern diagnostic and highly beneficial aids in the diagnosis of liver and gall bladder diseases. It allows to observe the internal anatomy and size of organs. During last few decades, two-dimensional B-mode and real ultrasonography has been introduced (Nyland and Park, 1983). The present paper reports ultrasonographic findings, changes in various haematological and biochemical parameters in hepatic disorders of dogs.

Total twenty dogs that presented at Teaching Hospital, College of Veterinary Science and Animal Husbandry, Mhow were used for the study. The Clinico hematobiochemoical and Ultrasonographic observations were taken at 0 day, 3rd, 8th, & 14th day of treatment.

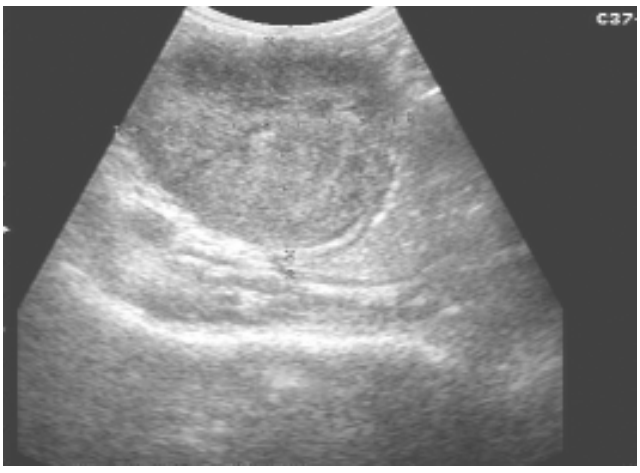
All the dogs were treated with, Inj. Ceftrioxone 22 mg / kg .bwt , i/v @ , and Inj dexamethasone @ 0.5 i/m, Inj D 5% syp. Proviboost tsf, bid, Inj. Astymin-3 (amino acids)@ 5-10 ml i/v ,Liq.Liv-52 and syp. Sorbiline tsf, bid for 5-7 days.

In all dogs, the values of Hb, and PCV, were found significant lower i.e. ($p<0.01$) and ($p<0.05$) respectively, while TLC and Neutrophils values was significant increased, on 14th day of treatment as compared with the 0 day, (Table-1).These findings are correlated with the findings of Chohan *et al.* (2009) and Thusara *et al.* (2006).

ALT , Globulin and bilirubin values were increased significant i.e. $p<0.01$ and $p<0.05$ respectively while total protein., albumin and A:G ratio were significantly lower ($p<0.05$) on 14th day as compared with 0 day (Table-2). The findings are in agreement



**Hyperechoic gallbladder (Cholecystitis) with engorged blood vessels.**



**Hypo echoic lesions with disturbance in the normal echo texture of liver parenchyma in a dog. (Case No. 4379)**

*Part of M.V.Sc.&A.H. thesis submitted to the Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior,(M.P) 2010

**Table 1:** Mean ± SE of haematological values at different days of observations.

| Parameters | 0 Day | 3RD Day | 8TH Day | 14TH Day |
|---|---|---|---|---|
| Hb (g/dl) | 12.2±0.45[d] | 11.1±0.38 [c] | 10.1±0.33 [b] | 9.3±0.42 [a] |
| PCV (%) | 32.8±1.11[c] | 31.7±1.14b [c] | 30.6±.88 [b] | 28.3±1.12 [a] |
| TLC(Thousand/Cu mm) | 19.17±1.59[a] | 20±1.03 [b] | 22.2±4.42 [c] | 23.8±2.19 [d] |
| N (%) | 73.3±1.59[a] | 74.2±1.79 [a] | 77.4±1.26 [b] | 78.6±1.02 [c] |
| L (%) | 23.4±1.60[d] | 22.2±0.99 [c] | 19.8±1.02[b] | 17.4±0.87 [a] |
| M (%) | 2.5±0.69 | 2±0.29 | 1.7±0.24 | 1.7±0.80 |
| E (%) | 0.7±0.26 | 1.3±0.76 | 0.7±0.24 | 1.4±0.17 |
| B (%) | 0.1±0.10 | 0.3±0.10 | 0.4±0.14 | 0.9±0.14 |

a, b, c, d: means for a particular parameters with at least one common alphabet as superscript do not differ significantly with each other.

**Table 2:** Mean ± SE of biochemical values at different days of observations.

| Parameters | 0 Day | 3RD Day | 8TH Day | 14TH Day |
|---|---|---|---|---|
| ALT(U/L) | 80.19±13.54 [a] | 87.70±11.86 [b] | 101.50±16.36 [c] | 118±23.50 [d] |
| Total Protein (g/dl) | 13.21±0.24 [b] | 6.48±0.15 [a] | 6.28±0.54 [a] | 5.56±0.19 [a] |
| Albumin (g/dl) | 2.22±0.22 [b] | 1.80±0.08a [b] | 1.55±0.11 [a] | 1.47±0.10 [a] |
| Globulin (g/dl) | 4.07±0.31 [a] | 4.68±0.17 [b] | 4.86±0.22 [b] | 6.33±0.14 [c] |
| A:G Ratio | 0.58±0.12 [b] | 0.54±0.20 [b] | 0.32±0.03 [a] | 0.41±0.15 [a b] |
| Serum Bilirubin (U/L) | 1.33±0.08 [a] | 2.01±0.07 [b] | 2.82±0.05 [c] | 3.59±0.11 [d] |

a, b, c, d: means for particular parameters with at least one common alphabet as superscript do not differ significantly with each other.

with the findings of Bandyopadhyay *et al.* (2008), and Bertand (1981).

The urine of dogs affected with hepatitis, was yellow to greenish yellow, transparent, foam was formed on shaking, and similar findings were observed in of cholecystitis, hepatic abcess / cyst and hepatic tumor, Tripathi (2008), Benjamin (2001), have reported the similar findings..

It is concluded that ultrasonographic technique proves its importance for the diagnosis of hepatic and gallbladder abnormalities. Various architectural abnormalities were recorded and correlated with clinico- haemato-biochemical changes, how were, the severity of condition can not be established only by the ultrasonographic observation.

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# Haemato-biochemical profile of dogs with prostatic affections

*Chandan Singh[1], S.K. Mahajan[2†], J. Mohindroo[3], N.S. Saini[4] and S.S. Singh*[5]
Department of Veterinary Surgery and Radiology, College of Veterinary science,
Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana-141004, Punjab.

## Abstract

The present study was conducted on 10 dogs suffering from prostate affections to evaluate various haemato-biochemical changes. The diagnosis was confirmed by clinical, radiographic ultrasonographic and Ultrasound guided fine needle aspiration biopsy (USG-FNAB) findings. In case of benign prostate hyperplasia (BPH) prostatitis, and prostatic carcinoma the blood SGPT, SGOT and alkaline phosphatase values were markedly elevated.

**Keywords:** Dogs, Haematology, Ultrasound guided fine needle aspiration biopsy.

Prostatic disorders are common in middle-aged and older sexually intact male dogs (Olsen *et al.* 1987) and have been categorized as hyperplasia, cyst, inflammation, primary and metastatic neoplasia. The diagnosis of prostatic disease in the past has been problematic and workers relied primarily on prostatic fluid analysis, commonly collected through prostatic massage, blind percutaneous fine needle aspirate and radiographic imaging (Olsen *et al.,* 1987). There is paucity of literature about the haemato-biochemical profile of dogs suffering from prostatic affections, therefore, the present investigation was undertaken to recent haematobiochemical changes in prostatic affection.

## Materials and Methods:

The present study was conducted on 10 clinical cases of male dogs aged 1.5 - 10 years and body weight ranging from 9 to 36 kg presented at the small animal teaching hospital, GADVASU, Ludhiana with varying symptoms. The animals were subjected to systematic evaluation for diagnosis of disease conditions. Hematological and biochemical parameters including Hb (g/dl), TLC (x$10^3$ per µl), DLC (%), serum AKP, SGPT, SGOT (µ/L), BUN, Creatinine (mg/dL), total protein and albumin (g/dL) were determined (Coles, 1980). Radiography and ultrasonography was performed in all the animals to evaluate the status of the prostate (Bush, 2002). Confirmatory diagnosis was made by ultrasound guided fine needle aspiration biopsy (USG-FNAB) (Kraft *et al.*, 2008). The haemato-biochemical parameters were correlated with the disease conditions diagnosis.

*PhD Scholars, IVRI [1]Head, Division of Medicine & Coordinator Referral Veterinary Polyclinic, IVRI
[2]Senior Scientist Division of Medicine, IVRI
[3]Veterinary officer Karnataka

## Results and discussion

The animals were divided into following 3 groups based on clinical, haemato-biochemical radiographical, ultrasonographic and USG-FNAB findings viz Benign Prostate Hyperplasia, Prostatitis and Prostatic Carcinoma.

In all the animals radiography showed that there was an increase in the soft tissue density caudal to the neck of the urinary bladder with cranially displaced and distended urinary bladder. Ultrasonographic findings showed that the prostate was enlarged with normal or generalized increase in echogenicity in case of BPH, mixed echotexture in prostatitis and hyperechoic/ mixed, non uniform echotexture mass were evident at the neck of urinary bladder in the region of prostate in case of prostatic carcinoma. Rectal temperature was within normal range and heart and respiration rate were moderately elevated (Table 1). Anorexia, haematuria, history of urolithiasis, constipation, and pasty faeces etc. are the common clinical findings recorded in dogs with prostatic affections. Similar clinical signs were recorded by Paclikova *et al*. (2006) and Kraft *et al*. (2008) in prostatic affections in dog.

In animals diagnosed with BPH (N=3) the blood SGPT, SGOT and AKP values were elevated (Table 2). BUN and creatinine levels were normal in all except in one case in which BUN and creatinine level was markedly elevated (124 mg/dL and 3.1 mg/dL respectively). This could be attributed to concurrent renal failure diagnosed in this animal. Total protein and albumin level was within the normal range in all animals.

In majority of cases there was mild neutrophilic leucocytosis which might be due to concurrent inflammatory conditions (Paclikova *et al.,* 2006). The blood Hb was normal in two dogs, but was very low in dog with renal failure. The prostate was found bilobed uniformly enlarged on per-rectal examination in all cases of dogs having BPH.

In case of prostatitis the blood SGPT, SGOT and AKP values were moderately elevated in all animals (Table 2). The increase in AKP value might be due to inflammation and degeneration of prostate cells (Paclikova *et al.* 2006). Total platelet count , BUN, creatinine, total protein and albumin level were within the normal range in all animals. In majority of cases there was neutrophilic leucocytosis as also reported by Paclikova *et al*. (2006). The prostate was found uniformly enlarged with smooth outer surface on rectal examination in all cases.

In case of prostatic carcinoma, the blood SGPT, SGOT and AKP value was markedly elevated in all animals (Table 2). The value of AKP was more than the upper limit of the normal range and such increases are usually indicative of the neoplastic conditions in dogs (Bush, 2002). There was marked neutrophilic leucocytosis. The blood Hb was within normal range in two cases and was low in rest of the two cases. The prostate was uniformly enlarged with smooth outer surface on per-rectal examination. Rectal examination of prostate revealed an enlarged, irregularly asymmetrical, usually non-painful, gland.

The haemato-biochemical parameters are not diagnostic for dogs suffering from BPH and prostatitis unless correlated with clinical examination. However, elevation of AKP values may be indicative of prostatic carcinoma when supported with clinical, radiographic and ultrasonographic findings.

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**Table 1:** Rectal temperature, pulse and respiratory rate in cases of prostatic affections.

| Affections of prostate | Rectal Temperature (°F) | Respiratory Rate (Breaths/min) | Heart Rate (Beats/min) |
|---|---|---|---|
| USG-FNACBPH (N=3) | 102.87±.406 | 42.00±3.055 | 98.00±5.774 |
| USG-FNAC Prostatitis (N=3) | 103.13±2.659 | 41.33±8.110 | 95.33±7.333 |
| USG-FNACProstate carcinoma (N=4) | 101.92 ±.522 | 40.00±3.162 | 96.00±5.228 |
| USG-FNACNon Diagnostic sample (N=2) | 102.80±.200 | 41.00±5.000 | 91.00±1.000 |

**Table 2:** Hematobiochemical parameters in prostatic affections.

| Parameters | Prostatic affections | | | Normal reference ranges* |
|---|---|---|---|---|
| | Benign Prostate Hyperplasia | Prostatitis | Prostatitis Carcinoma | |
| Hb(X g/dL) | 9.43± 2.88 | 10.33± 1.29 | 9.00± 2.70 | 12-18 |
| DLC ($X10^3/\mu L$) | 22.03± 3.96 | 19.72± 4.48 | 15.52± 4.02 | 6-17 |
| N (%) | 78.67± 10.35 | 92.33± 2.03 | 87.50 ± 1.71 | 60-70 |
| L (%) | 14.00± 5.03 | 6.67± 1.33 | 12.50 ± 1.71 | 12-30 |
| M (%) | 1.67±0.33 | 0.33±0.33 | - | 03-10 |
| E (%) | 5.67± 5.67 | 0.67± 0.67 | - | 02-10 |
| SGPT (µ/L) | 103.67± 8.95 | 131.00± 5.57 | 147.50± 20.56 | 8.2-57 |
| SGOT (µ/L) | 147.00± 51.21 | 123.67± 12.73 | 118.25± 17.85 | 8.9-49 |
| AKP (µ/L) | 229.67± 75.70 | 256.33± 23.68 | 296.25± 64.53 | 10.6-101 |
| BUN (mg/dL) | 57.33± 33.41 | 100.93± 76.56 | 88.00± 44.87 | 8.8-26 |
| Creatinine (mg/dL) | 1.83± 0.66 | 8.47± 7.62 | 4.65± 3.52 | 0.5-1.6 |
| Total Protein (g/dL) | 6.70± 0.10 | 6.90± .06 | 6.30± 0.33 | 5.5-7.5 |
| Albumin (g/dL) | 3.53±0.66 | 3.87± 0.03 | 3.40± 0.23 | 2.6-4.0 |

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# Training needs of veterinary officers in state department of animal husbandry

*Rupasi Tiwari[1], M.C. Sharma[2] and B.P. Singh[3]*
Indian Veterinary Research Institute, Izatnagar-243122, Bareilly, U.P.,

**Abstract**

The State Department of Animal Husbandry (SDAH) is acting as an extension organisation for livestock development and is entrusted with responsibility of transferring various technological advancement to field level apart from the major task of clinical and health care services. The field veterinary officers working at the 2nd tier of the SDAH play a big role in achieving this objective of health care and dissemination of scientific information to the field. Especially their effiency in terms of their knowledge about the various disease situations and their diagnosis / control/ preventive measures is utmost important .

Newer technologies are being generated at a very fast rate and therefore the veterinary officers in the SDAH need to remain abreast with the latest technological advancements for maintaining their efficiency and in turn the organizational effectiveness. Therefore in-service training of the veterinary officers is a mendatory for maintaing and refreshing their knowledge and skills. Keeping these points in view the present study was taken up to assess the awareness of the veterinary officers of the SDAH of UP and Uttarakhand (UKD)regarding the latest technological advancements in the field of veterinary sciences. Data was collected through multistage random sampling design from UP and UKD (selection was done by multistage random sampling wherein first 10 mandals were selected from 17 mandals of UP and then from each mandal one district was randomly selected thus making a total of 10 districts of UP viz., Lucknow, Muzaffarnagar, Basti, Etawah, Deoria, Azamgarh, Balrampur, Gautam Budh nagar, Rampur, Bareilly ) and 2 districts of Uttarakhand ( In Uttarakhand there are only two mandals and from each mandal one district was randomly selected thus making a total of two district viz., UdhamSingh Nagar and Dehradoon. Data was received from 167 respondents.

## Materials and methods

A large number of technologies in the area of veterinary sciences have been generated till now. In the present study important diagnostics, vaccines and drugs and feeding technologies were selected which which are causing major economic losses. The usage of vaccines selected for the study were as follows: Avian infectious bronchitis vaccine, Infectious Bursal Disease vaccine, Anti Rabies Vaccine, Goat Pox vaccine, Tissue culture sheep pox vaccine, Swine fever vaccine Lapinised, Fowl pox vaccine, Ranikhet Disease vaccine (Mukteshwar R2,B2 strain), Enterotoxemia vaccine, Black Quarter vaccine, Multicomponent Clostridial Vaccine, Fowl Cholera vaccine, Salmonella Abortus Equi Vaccine, Brucella Abortus (Strain 19) Living Vaccine, Haemorrhagic Septaecemia Oil Adjuvant vaccine, PPR vaccine. Further the diagnostic techniques selected for the study were Sandwich ELISA, Liquid phase ELISA, Dot Blot technique for FMD Diagnosis, Diagnostic kit of bluetongue in buffalo ,Kit for Ranikhet Disease, MATSA test for detecting preclinical Marek's disease, Embryo susceptibility test for avian encephalomyelitis diagnosis Allergic test for diagnosis of acute respiratory mycoplasmosis in poultry, COFAL test for diagnosis of avain leucosis virus infection, Bronchoscopy for diagnosis of respiratory infections, Latex agglutination test for diagnosis of leptospirosis, Tuberculin and ELISA for diagnosis of tuberculosis (TB) and ELISA for Paratuberculosis, ABR Antigen for diagnosis of brucellosis, IVRI, Crystoscope for determining oester period in animals. Further, various other technologies selected for assessment of perceived knowledge were Olinall skin ointment, Bovine horn plates and external skeletal fixation device for fracture management, Arsenic compounds for trypanosomiasis, Urea molasses liquid feed and urea molasses mineral liquid supplement, Urea molasses mineral block, Area specific mineral mixture for UP and Uttarakhand.

## Results and Discussion

### Perceived awareness of vaccines

Majority of Veterinary officers had knowledge about Hemorrhagic Septicemia oil adjuvant vaccine (100% ), Black quarter vaccine (83.83%), Ranikhet disease vaccine (85.02%), Antirabies vaccine (82.04%),

[1]Senior Scientist and I/C, ATIC, [2] Director
[3]Senior Scientist, Joint Directorate of Extension Education

Swine fever vaccine (62.87%), Brucella abortus living vaccine (62.87%) and PPR vaccine (68.86%). While most of the selected VO's did not have knowledge about the Multicomponent clostridial vaccine (59.88%), Avian infectious bronchitis vaccine (46.70%), Salmonella abortus equi vaccine (31.14% ) and fowl cholera vaccine (29.94% ) or were even not aware of these vaccines and did not respond to the query on these vaccines such as Fowl cholera vaccine (43.12 %) Salmonella Abortus Equi Vaccine (50.90%), Fowl Pox vaccine (52.09%), Multicomponent Clostridial Vaccine (31.74%) and Avian infectious bronchitis vaccine (48.51%).

**Perceived awareness of diagnostics**

Majority of respondents had knowledge about ABR antigen for diagnosis of brucellosis (56.89 %), IVRI crystoscope for determining optimum heat in animals (50.90%), tuberculin and ELISA for diagnosis of T.B. and paratuberculosis (52.10 %). About 43.11 percent of Veterinary Officers did not have knowledge about bronchoscopy and 34.14 percent did not have knowledge about Sandwich ELISA, Liquid phase ELISA, Dot blot technique for FMD diagnosis. Majority of V.Os. had not given response for COFAL test for detection of Avian Leucosis (82.64 %), Allergic test for diagnosis of acute respiratory mycoplasmosis in poultry (82.03 percent), MATSA test for detecting preclinical Marek's disease (77.84 percent), Latex agglutination test for diagnosis of leptospirosis (76.05 percent), Embryosusceptability test for Avian Encephalomyolitis diagnosis (71.85 percent) and diagnostic kit of blue tongue in buffalo (70.66 percent), which shows that they did not have knowledge about the technologies.

**Perceived awareness of the therapeutics and unpractical**

Majority (65.87 percent) of Veterinary Officers know about Olinall skin ointment. About 25.15 percent Veterinary Officers did not know and 65.86 percent did not respond for Bovine horn plates and external skeletal fixation device used for fracture management. Similarly, about 38.93 percent of Veterinary Officers did not know while 46.10 percent did not respond about Arsenic compounds for trypanosomiasis. About 40.11 percent of Veterinary Officers had knowledge about Area Specific Mineral Mixture for U.P. and Uttaranchal. 25.15 percent of Veterinary Officers did not know and majority ( 65.86 percent) did not responded about urea molasses liquid feed and urea molasses mineral liquid supplement. However, around 34.73 percent of Veterinary Officers knew about urea molasses mineral block. Dakhore and Bhileganokar (1987) in a similar study on Veterinary Extension Officers reported that there is a need for regular in-service training programmes to equip the Veterinary Extension Officers to handle each job area more effectively.

**Trainings attended in last five years**

Majority of the Veterinary Officers' (34.73%) reported that they never attended any training in last five years while 19.76 percent reported one training , 20.96 percent reported two trainings, 16.77 percent reported three trainings and 7.78 percent reported that they have attended more than three training in last five years. According to Stoner, *et al.* (1995), staff training is an indispensable strategy for motivating workers. Yadav (1987) reported that role performance is significantly related with educational attainment, number of training attended, length of work experience and attitude towards job.

**Opinion on nature of training**

More than 50 percent of Veterinary Officers recommended to undergo one training every year, while 29.94 percent recommended one training every two year and 16.77 percent recommended training in every six months for their knowledge and skill up gradation. About 52 percent of Veterinary Officers' preferred one week duration for their training programme, while 32.93 percent preferred two weeks and 14.98 percent preferred more than two weeks duration for each training programme. Majority (83.83%) of Veterinary Officers preferred practical oriented training and remaining preferred theoretical oriented training courses. According to Pareek and Rao, 1992, training is the most important function that directly contributes to the development of human resources. Training is essential because technology is developing continuously and at a very fast rate. Systems and practices get outdated soon due to the new discoveries in technology including technical, behavioral and managerial aspects.

**Major areas preferred for training in future**

About half of the Veterinary Officers preferred

training in the area of disease diagnosis and health coverage. About 23 percent preferred training on animal breeding and reproduction and equal percent preferred animal management, modern laboratory techniques and advances in surgical procedure as subject matter for training. In future trainings, around 17.95 percent preferred training on extension programmes, 10.17 percent preferred animal nutrition, 6.5 percent preferred advanced training in artificial insemination. Various other areas such as Pathology, radiology, wild animal management, training on administrative procedures, information technology, entrepreneurship development were other areas preferred for training in future.

## Conclusion

Results of the study reveal that majority of the Veterinary Officers' did not have knowledge about the latest vaccines and diagnostic test for detection of various important diseases, and even did not know about the latest feed supplements developed for livestock. Majority of the Veterinary Officers' (34.73%) reported that they never attended any training in last five years and more than 50 percent of Veterinary Officers recommended to undergo one training every year for their knowledge and skill up-gradation. Majority preferred one week , practical oriented training mainly on disease diagnosis and health coverage, followed by animal reproduction, management and advanced surgical procedures. It is essential that the veterinary officers working in the field are abreast with the latest technological developments with regards to the animal health care and management, so that they can work in a more effective manner and provide a more effective livestock health delivery services in the country.

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# *In-vitro* antibacterial activity of hot aqueous extract of *Ocimum sanctum* leaves

*Amit Kumar*, Anu Rahal*** and Amit K. Verma****
Pt. Deen Dayal Upadhayay Pashu Chikitsa Vigyan
Vishwavidyalaya Evam Go Anusandhan Sansthan, Mathura-281001, U.P., India.

**Abstract**

Bacterial organisms viz; *Staphylococcus aureus, Escherichia coli, Salmonella* typhimurium, *Klebsiella pneumonia, Pseudomonas aeruginosa* and *Proteus vulgaris* were used to study antibacterial properties of extract of *Ocimum sanctum* leaves. 0.5 ml of respective bacterial cultures containing approximately $3x10^4$ cells/ml bacterial cell suspension / plate using three nutrient agar plates per experiment were used against the discs containing four different concentration 2 mg / 5 mg /10 mg / 20 mg of *O. sanctum* hot aqueous leaves extract. The study revealed that aqueous extract of *Ocimum sanctum* leaves has dose dependent antibacterial activity.

**Key words:** Antibacterial activity, Disc diffusion method, *Ocimum sanctum.*

*Ocimum sanctum* possess antifertility, anticancerous, antidiabitic, antifungal, antimicrobial, hepatoprotective, cardio protective, antiemetic, antispasmodic, analgesic, adaptogenic and diaphoretic action. (Godhwani *et al.*,1987, Prakash and Gupta, 2005). Hence, the present study was conducted to assess the antibacterial activity of hot aqueous extract of *O. sanctum* leaves against most common food and environmental bacterial contaminants. For this purpose leaves of *O. sanctum* were collected from the campus of Pt. Deen Dayal Upadhayay Pashu Chikitsa Vigyan Vishwavidyalaya Evam Go Anusandhan Sansthan, Mathura and dried under shade. Dried leaves were used for preparation of hot aqueous extract (HAE) by the soxlet apparatus as per the method of Goel *et al.* (2005). The solvent used for preparation of leaves extract was triple glass distilled water. HAE was analyzed against bacterial organisms viz; *Staphylococcus aureus, Escherichia coli, Salmonella* typhimurium, *Klebsiella pneumonia, Pseudomonas aeruginosa* and *Proteus vulgaris* to study the antibacterial properties of *Ocimum sanctum*. All these organisms were obtained from the Department of Microbiology and Immunology, Pt Deen Dayal Upadhayay Pashu Chikitsa Vigyan Vishwavidyalaya Evam Go Anusandhan Sansthan, Mathura. Prior to use all the bacterial isolates were characterized on the basis of morphological, cultural and biochemical characteristics as per the standard protocols of Cruickshank (1975). McFarland's nephlometer was prepared for the determination of bacterial concentration and 0.5 ml of respective bacterial cultures containing approximately $3x10^4$ cells/ml bacterial cell suspension / plate were used on three nutrient agar plates per experiment. Average of three plates was considered as the zone of inhibition. The antibacterial effect was studied by disc diffusion method (Bauer *et al*. 1996). Discs were prepared by the absorption of extract powder on blank discs obtained from Hi media (Mumbai). Prior to use discs were tested for sterility on nutrient agar plates. Discs containing four different concentration 2 mg / 5 mg /10 mg / 20 mg of *O. sanctum* hot aqueous leaves extract were planted at even distance (8-10 mm) on nutrient agar plates on which bacterial culture were streaked. The culture plates were incubated at $37^oC$ for 48 hours and antimicrobial activity of extract marked by the zone of inhibition and bacterial growth around the disc was measured in mm by scale. Zone of inhibition was measured at the interval of 6 hours from 24 to 48 hours (Table1). The observations revealed antibacterial activities of *O.* sanctum against various clinical isolates, however the antibacterial effect was dose dependent and it increased with the increase of quantity of extract as the size of the zone was largest with the concentration of 20mg in all the isolates. The effects also vary between bacteria as zone of inhibition vary for the same concentration of extract and 5mg concentration of extract showed no zone of inhibition in case of *E.coli* and *Pseudomonas aeruginosa*. All the isolates were resistant to the 2mg concentration except *Salmonella* typhimurium. Our findings are in accordance to the findings of Seetharam (2003), Shooken *et al.,* (2005) and Kumar (2006) who assessed antibacterial effects of *O. sanctum* against various bacterial species viz. *E.coli; Bacillus anthracis; Mycobacterium tuberculosis, Neisseria gonorrhea* and *Salmonella Typhimurium*, respectively. They also reported dose dependent effects which vary in between the bacteria. Gupta *et al.,* (2001) reported that ethanolic

*Corresponding Author
Department of Microbiology & Immunology
E.mail address: balyan74@gmail.com
**Department of Pharmacology & Toxicology
***Department of Preventive Medicine & Epidemiology

**Table 1: Antibacterial effect of hot aqueous extract of *O. sanctum* leaves**

| Bacterial isolates | Quantity of Extrac t /disc (mg) | Zone of inhibition (mm) | | | | |
|---|---|---|---|---|---|---|
| | | 24 hr | 30 hr | 36 hr | 42 hr | 48 hr |
| *Staphylococcus aureus* | 2 | R | R | R | R | R |
| | 5 | 12 | 12 | 10 | 9 | 8 |
| | 10 | 14 | 14 | 12 | 11 | 10 |
| | 20 | 16 | 16 | 15 | 15 | 13 |
| *Escherichia coli* | 2 | R | R | R | R | R |
| | 5 | R | R | R | R | R |
| | 10 | 11 | 11 | 10 | 9 | 7 |
| | 20 | 14 | 14 | 13 | 11 | 9 |
| *Salmonella* Typhimurium | 2 | 10 | 10 | 9 | 8 | 6 |
| | 5 | 13 | 13 | 12 | 11 | 10 |
| | 10 | 14 | 14 | 12 | 12 | 11 |
| | 20 | 16 | 16 | 15 | 15 | 15 |
| *Klebsiella pneumoniae* | 2 | R | R | R | R | R |
| | 5 | 12 | 12 | 12 | 10 | 8 |
| | 10 | 15 | 15 | 15 | 14 | 14 |
| | 20 | 16 | 16 | 15 | 15 | 15 |
| *Pseudomonas aeruginosa* | 2 | R | R | R | R | R |
| | 5 | R | R | R | R | R |
| | 10 | 12 | 12 | 12 | 9 | 9 |
| | 20 | 14 | 14 | 14 | 12 | 12 |
| *Proteus vulgaris* | 2 | R | R | R | R | R |
| | 5 | 11 | 11 | 11 | 10 | 10 |
| | 10 | 14 | 14 | 14 | 12 | 12 |
| | 20 | 16 | 16 | 16 | 12 | 12 |

R- Resistant (No zone of inhibition)

extracts revealed larger zone of inhibition in comparison to aqueous extract of *O. sanctum*. However, the effects of aqueous extracts were also significant as Geetha and Vasudevan (2004) observed larger zone of inhibition in aqueous extract in comparison to alcoholic extract. Thus hot aqueous extract of *O. sanctum* leaves has antibacterial activities and justifies its traditional use as antibacterial agent.

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# Diagnostic potentiality of mastitogen in dairy herd

*A. Tyagi, B. Singh, A.K. Upadhaya and M. Kumar*
College of Veterinary and Animal Sciences, G.B.P.U.A&T., Pantnagar-263145, U.S. Nagar, Uttarakhand.

## Abstract

A preliminary test with 80 random quarter milk samples was compared with conventional microbiological methods that resulted in agreement with those analyzed by bacteriology. Since a few pathogens may yield a positive PCR so the method can be used at earlier stages of infection, in carriers, less presence of bacteria, in the presence of residues of therapeutic agents and preservatives without possibility of false negative. On CMT 57.8% samples were positive, out of which 63.6 % *S.aureus* and 25.0 % *Streptococcus.*

**Key Words:** mPCR, Mastitis, *Staphylococcus aureus, Streptococcus*

Bovine mastitis is the costliest diseases of dairy cattle, resulting in reduced milk yield and quality in Indian. Rapid identification of disease causing pathogenic bacteria can enhance the routine testing of milk samples by reducing the time required for testing, as well as the cost of labor and media employed.

PCR can detect bacteria in the presence of residual therapeutic antibiotics and preservatives in milk and therefore there won't be false negative results because of lack of bacterial growth. An early detection of mastitis can reduce the losses (Milner *et al.* 1997). So at the place of conventional methods, application of DNA-based assays might circumvent the drawbacks by rapid screening of a large number of pathogens may be carried out (Fitzgerald *et al.* 2001and Cremonesi *et al.* 2006) within hours. Thus the current study was undertaken.

The samples were collected from eighty suspected animals before milking according to standard procedures described by the National Mastitis Council and also subjected to CMT, positive cases were incubated in tryptic soy broth yeast extract broth (TSBYE) at 37°C for bacterial DNA extraction and purification (Rosec *et al.* 2002). The bacterial culture lysed, cooled and aliquot (2 ìL) of the extract was used as the template for PCR amplification (Phuektes *et al.* 2003). The four PCR primer sets used for m-PCR study, corresponding gene targets, source and size of expected amplification products are hereunder.

Multiplex PCR amplification was carried out under defined cycling conditions as shown below in a 50-ìL reaction mixture and PCR products will be analyzed by gel electrophoresis in 1.7% agarose gel

Out of 80 samples collected 44 (55.0%) were CMT positive. On mPCR amplification 28 (63.6%) out of 44 samples detected *S. aureus* and 11 (25.0%) *Streptococcus* spp. Varying prevalence (15-89 %) of *S. aureus* has been reported from mastitic milk (Jiang *et al.*, 2001). To validate our extraction assay bovine samples with high SCC were processed for bacterial DNA extraction and identification. All samples extracted were successfully amplified using target bacteria-specific primers. Identification of pathogens obtained by PCR assays was in full agreement with that obtained by microbiological methods. The detection limit of the method was found to be in the range of $10^4$–$10^5$ CFU/ml. A similar level of sensitivity (3.125 x $10^2$ to 5 x $10^3$ CFU/ml) for the detection of *Staph. aureus* in milk by PCR was previously reported (Phuektes *et al.* 2003). The mPCR in this study took less than 5 hrs.

| Species | Target Gene | Primer-Nucleotide sequence (5' to 3') | Product Size(bp) | Reference |
|---|---|---|---|---|
| *S. aureus* | *nuc* | **F**-GCGATTGATGGTGATACGGTT<br>**R**-AGCCAAGCCTTGACGAACTAAAGC | 270 | Brakstad *et al.*(1992) |
| *Streptococus* spp. | *tuf* | **F**-GTACAGTTGCTTCAGGACGTATC<br>**R**-ACGTTCGATTTCATCACGTTG | 197 | Francois *et al.* (2004) |

| Cycle | Denaturation | | Annealing | | Polymerization | |
|---|---|---|---|---|---|---|
| First cycle | 950C | 5 min | - | - | - | - |
| 35 cycles | 950C | 1 min | 550C, | 30 sec | 720C | 30 sec |
| Last cycle | - | - | - | - | 720C | 10 min |

similar to Riffon *et al.* (2001).

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# *Demodex cornei* causing demodicosis in dogs

*Sudhakara Reddy. B.K. Nalini Kumari, V. Chengalva Rayulu[*] and S. Siva Jothi[*]*
Department of Clinical Medicine, College of Veterinary Science,
Sri Venkateswara Veterinary University, Tirupati- 517 502, Andhra Pradesh, India

## Abstract

Dogs with demodicosis exhibited varied degrees of papules, pustules, scales, erythema, alopecia, deep folliculitis and hyper pigmentation. Short demodicid mites that were stubby with a blunt end were seen in glass slide and tape impression smears while different stages of live demodicid mites were seen in deep skin scrapings. Degenerate as well as intact neutrophils, extra and intra cellular cocci were also seen in pyodemodicosis. *Demodex cornei* was identified based on its morphology (stubby with a blunt end) and the mean total body length (123 ±1.9 µm). Mean length of Demodex canis was 212.57 ±2.06 µm. Dogs with pyodemodicosis had decreased haemoglobin, total erythrocyte count and serum albumin and increased leucocyte, neutrophil and eosinophil counts and serum cholesterol.

**Key words:** *Demodex cornei*, Demodicosis, dog

Demodicosis in dogs is caused by the mites of *Demodex*. While the follicular mite, *Demodex canis* is the most common species, there have been two more species of *Demodex* being reported abroad in the recent past. They include a short – bodied, stubby, *D. cornei* with a blunt terminal end that lives in the superficial layers of the stratum corneum (Chesney, 1999 and Paterson, 2008) and *D. injai*, a long bodied mite, an inhabitant of canine pilosebaceous unit (Paterson, 2008). The article presented here the occurrence of a relatively new species of *Demodex*, *i.e. D. cornei* in demodicosis of dogs.

## Materials and methods

Seven dogs aged between one and four years of both the sexes, treated for skin problems repeatedly for the past 4 to 8 months with only transient relief were referred to College Hospital of College of Veterinary Science, Tirupati.The past medication given included different antibiotics for shorter duration and other symptomatic therapy.

All the dogs were subjected to thorough clinical examination. Similarly detailed laboratory examination was also carried out through slide impression smears and tape impression smears; skin scrapings and hair plucks of each dog according to the methods described by Rosenkrantz (2008) and Little wood (2003) respectively as the problem was persistant. Micrometry was carried out on forty two mites of two different types of *Demodex*. Whole blood and serum were collected for haematology, estimation of total protein, albumin and cholesterol. Total $T_4$ and free $T_4$ were estimated by ELISA using a kit obtained from United Biotech Inc.

## Results and Discussion

Clinical examination revealed presence of varying degrees of papules, pustules, erythema, alopecia, deep folliculitis, hyper pigmentation, pruritus, loss of skin texture, oozing of serous, bloody discharges with foul smell and pruritus in six dogs. One dog had only scales, pruritus and alopecic dry lesions. Lesions were spread over all limbs, back, both sides of the barrel, base of the tail, forehead and ear base in all the seven dogs.

Slide impression smears collected from six dogs with wet lesions and stained with new methylene blue revealed intact as well as degenerate neutrophils, extra and intra cellular cocci and short demodicid mites. Tape impression smears from one dog with dry skin lesions revealed short *Demodex* mites alone. Deep skin scrapings from different locations of lesions of all seven dogs revealed different stages of live *Demodex* mites and ova of the mites. But hair pluck could reveal mites of *Demodex* in four dogs only. Based up on the area of involvement, and the mites observed, the condition was diagnosed as generalized squamous and pyodemodicosis in one and six dogs respectively. In every case, two types of Demodex mites were found. The morphology and size of the mites observed in impression smears (glass slide / tape) were different as they were short and stubby with a blunt end when compared to the mites obtained from deep skin scrapings (Fig.1). These short bodied mites were considered as *D. cornei* based on morphology and micrometrical

*Department of Veterinary Parasitology.

findings as also done by (Chesney, 1999). Such surface dwellers were also reported previously by Chen (1995) and Saridomichelakis (1999) in their studies on demodicosis. The measurements noticed in the present study were almost identical with the measurements of *D. cornei* i.e. total length, 122.6±12.0µm (90 to 148 µm); gnathosoma, (19.0±2.6µm); podosoma (56.3±8.0µm) and opisthosoma (47.2±9.2 µm) as reported by Chesney (1999). *Demodex cornei* could be a mutant of *D. canis* or a new species (Carlotti. 2010). The mites observed in deep skin scrapings and hair pluck were considered as *D. canis* based on their morphology i.e. pointed opisthosomal terminal end and size ranging from 250-300 µm. Though *D. injai* can also be found in deep skin scrapings, it would be much longer as its total body length was 334 - 368 µm (Craig, 2003).

In the present study, the mean total body length (123±1.9 µm) of *D.cornei* was much less than that of *D. canis* (212.57±2.06µm). The mean total body length of the mites obtained from deep skin scrapings i.e. *D. canis* was almost agreeable with Chesney, 1999 (226.1±11.68µm), and Nutting and Desch, 1978 (224.3 µm). Lengths of total body, podosoma and opisthosoma of both types of the mites differed statistically significantly (P: 0.00) while gnathosoma did not differ significantly.


A. ***Demodex canis*** **in deep skin scrapings**
B. ***Demodex cornei*** **in tape impression smears**

**Fig.1 Demodex mites**

There are no distinguishing features of history or clinical symptoms specific to *D. cornei* (Tater and Patterson, 2008) and the symptoms may mimic classic demodex infestation (Schwassman, 2009) as also observed in the present study. *D. cornei* has been reported in association with a generalized, pruritic (moderate to severe), scaly dermatitis (Mason, 1993). In the present study, *D. cornei* was found to be associated with scaly squamous generalized demodicosis (one dog) and generalized pyoderma (six dogs). *D. cornei* may be contagious (Chesney, 1999 and Schwassman, 2009) and also seems to be present in a dog only in cases of simultaneous infestation with *D. canis* (Carlotti, 2010) as also noted in the present seven dogs.

Dogs affected with demodicosis revealed significantly (P<0.01) decreased haemoglobin (10 ±0.55 g/dl) and total erythrocyte count (5.28 ±0.28 x $10^6$/ cumm); which might be due to the loss of skin protein as reported by Seigmund *et al.*, 1986. These dogs also had leucocytosis (14466 ±50.16/cumm); absolute neutrophilia (11996/cumm) and eosinophilia (828 ±150.15/cumm). The accompanying pyoderma in these dogs might have resulted in leucocytosis, neutrophilia and eosinophilia. Dog with sqamous demodicosis exhibited only an absolute eosinophilia (548 /cumm). Dogs with pyodemodicosis showed significantly (P<0.05) reduced albumin (2.83 ±0.23 g/dL) which could be due to its loss through inflammatory exudates (Jain, 1986). These pyodemodectic dogs also exhibited significantly increased (P<0.05) cholesterol (146.50 ±33.88 mg/dl) which could be due to the stress associated with the infection (Gera *et al.*, 2009). Affected dogs (7) had the mean total $T_4$ and free $T_4$ values of 2.51 ±0.23 µg/dL and 1.32 ±0.14 ng/dL respectively which were within the normal range. But Saridomichelakis *et al.*, 1999 reported hypothyroidism as an underlying factor in a dog with generalized

demodicosis.

The present study suggests that apart from examination of deep skin scrapings, examination of glass slide or tape impression smears may also be made a regular practice while dealing with demodicosis suspected dogs in order to detect the surface dweller like *D. cornei*.

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# Therapeutic management of conjunctivitis in dogs

*S. Bharathi, K.B.P. Raghavender and V. Gireesh Kumar*
Department of Surgery and Radiology
College of Veterinary Science, Rajendranagar, Hyderabad - 500 030. Andhra Pradesh

**Abstract**

Out of 110 cases of diseases of eyes recorded in dogs, seven cases were recorded as conjunctivitis. Culture and antibiotic sensitivity test was undertaken in thirteen eyes Staphylococcus species was found as the causative organism and *Klebsiella* was the cause in one case. Ciprofloxacin was the antibiotic of choice, followed by cefotaxim, ceftriaxone and gentamicin. All the cases responded to treatment with topical antibiotics and were free of symptoms by the end of one week after initiation of treatment.

**Keywords:** Conjunctivitis, Dogs.

Dogs are frequently presented to practising clinicians with "red eyep< condition. But all "red eyes" are not conjunctivitis in dogs. The present study was conducted to record the different ocular conditions affecting dogs in and around city of Hyderabad, Andhra Pradesh.

## Materials and Methods

The eyes were examined grossly to evaluate the type of exudates. Any changes in the conjunctiva like congestion, edema and growths were recorded. The debris around the eyelids was cleaned with sterile normal saline. The samples for culture and sensitivity test were collected using sterile swabs moistened with sterile normal saline. The causative organisms were identified, and antibiotic sensitivity test was conducted as per the procedure described by Quin *et al*. (2002). Till the test results were obtained, Ciprofloxacin[1] eye drops were instilled into the affected eyes. Thereafter, the cases of infectious conjunctivitis were treated by instillation of antibiotic eye drops according to the results of the culture and antibiotic sensitivity tests. These drops were instilled for three to five times per day for a maximum of seven days.

Conjunctivitis was recorded in Spitz, German Shepherd, Boxer, Pug, Great Dane, Terrier, and in non-descript breed of dogs. Intense congestion, profuse lacrymation and irritation of the eyes exhibited by constant rubbing of the eyes with paws were the constant clinical signs in all the seven cases presented. Purulent discharges were seen in three cases, blood mixed mucopurulent discharges and sclera blood vessels encroaching on to the cornea was observed in one case. Chemosis of the upper palpebral conjunctiva protruding through the palpebral fissure was seen in one case, while the swollen bulbar conjunctiva was inflamed and apparently encroaching on the cornea was seen in another dog.

## Results and Discussion

A total of fourteen conjunctival swabs were collected from cases presented, and were tested for antibiotic sensitivity. *Staphylococcus aureus* species was isolated from thirteen eyes whereas *Klebsiella* species was isolated from one eye. Antibiotic sensitivity test results indicated that *Staphylococcus aureus* was sensitive to ciprofloxacin in eight cases, chloramphenicol in three cases, and to cefperazone and amikacin in one case each. The *Klebsiella* organism was found sensitive to ciprofloxacin followed by cefotaxim, ceftriaxone and gentamicin. All the cases presented with conjunctivitis responded well to treatment within two days after therapy with the specific antibiotic. All the cases recovered uneventfully and were free of symptoms by the end of one week.

The symptoms of conjunctivitis encountered in the present clinical study were consistent with the symptoms recorded by Andrew (2000), Bath and Dua (2007).

A very low incidence of conjunctivitis (7 out of 110 cases) was recorded which could be attributed to the periodic occurrence of the disease. Bjerkas (2006) reported that the diseases that can be confused with conjunctivitis are keratitis, episcleritis, uveitis and glaucoma. In addition, he stated that all the causes of "red eyes" in dogs were not conjunctivitis. Hendrix (2007) and Hendrix (2009) also stated that the primary bacterial conjunctivitis is very rare in dogs. This may

[1]Cifran eye drops. Ranbaxy Laboratories Ltd, Gurgaon – 1.

be reason for recording only seven cases of primary conjunctivitis in the present study.

Culture and antibiotic sensitivity tests showed that *Staphylococcus aureus* species was the most commonly isolated pathogen in thirteen out of the fourteen cases with *Klebsiella* species accounting for one case. Almost similar bacterial growth was also obtained by Prado *et al.* (2005), Bath and Dua (2007) and Wang *et al.* (2008). On the contrary, completely different pathogens were isolated by different workers like Wang *et al.* (2008) and Swinger *et al.* (2009).

Results of the antibiotic sensitivity test of the present study are in conformity with those of Lin and Peterson-Jones (2007) who also recorded that ciprofloxacin was the most effective antibiotic against most isolates. The variations in the bacteria identified by various workers could be attributed to geographical variations, since pathogens also vary from place to place. In the present study, clinical response to conjunctivitis was seen within two days after the proper antibiotic therapy was initiated, which was based on the culture and antibiotic sensitivity test results. Hendrix (2007) also made similar observations. There were no complications and all the cases recovered uneventfully and were completely free of symptoms by the end of one week.

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# Antibacterial assay of essential oils against some pathogenic bacteria

*Jugendra Pal[1], S.P. Singh[#2], Om Prakash[3], A.K. Pant[3*] and C.S. Mathela[4]*
Department of Pharmacology & Toxicology
G.B.Pant University of Agriculture & Technology, Pantnagar-263145, U.S. Nagar, Uttarakhand

## Abstract

Nine essential oils isolated from rhizomes and seeds of *Zingiber roseum* and *Zingiber chrysanthum*(Zingiberaceae), aerial part of *Nepeta hindostana* (Lamiaceae) rhizomes, seeds, leaves and flowers of *Glycosmis pentaphylla* (Rutaceae) were tested for their antibacterial assay against three gram negative bacteria viz; *Salmonella enterica, Pasteurella multocida, Escherichia coli* and one gram positive bacteria, *Staphylococcus aureus* by disc diffusion and tube dilution methods. The oils showed broad spectrum antibacterial activity except *Zingiber chrysanthum* seed and *Glycosmis pentaphylla* leaf essential oils which were not effective against *P. multocida* and *E. coli* respectively. The antibacterial activity showed the inhibition zones ranging 8-21 mm, by disc-diffusion method while the minimum inhibitory concentration (MIC) values ranged from 0.97-62.5ì L /mL depending on the susceptibility of the tested organisms.

**Keywords:** Antibacterial activity, Essential oils, *Glycosmis pentaphylla, Nepeta hindostana, Zingiber chrysanthum, Zingiber roseum.*

Most by salmonellosis are caused by food infected with *Salmonella enterica* a gram negative bacterium, which often infects cattle and poultry. Domestic cats and hamsters have also been shown to be sources of infection to humans (Swanson *et al,* 2007). Secreted proteins are of major importance for the pathogenesis of infectious diseases caused by *S. enterica*. A remarkable large number of fimbrial and non-fimbrial adhesins are present in *Salmonella* which mediate biofilm formation and contact to host cells. Secreted proteins are also involved in host cell invasion and intracellular proliferation, two hallmarks of *Salmonella* pathogenesis (Hensel, 2009). *Pasteurella multocida* a gram-negative bacterium, can cause a zoonotic infection in humans which typically is a result of bites or scratches from domestic pets. Many mammals and fowl harbor it as part of their normal respiratory micro biota, displaying asymptomatic colonization (Kuhnert and Christensen 2008). It is the most common cause of infection from animal injuries (Pneumonia in cattle and pigs, atrophic rhinitis in pigs and goats and wound infections, specially after dog/ cat-bites) A high leukocyte and neutrophil count is typically observed, leading to an inflammatory reaction at the infection site (generally a diffuse localized cellulitis. It can also infect other locales, such as the respiratory tract. In more serious cases, a bacteremia can result, causing an osteomyelitis or endocarditis. The bacteria may also cross the blood-brain barrier and cause a meningitis (Casolari and Fabio 1988; Ryan and Ray 2004**)**. *Escherichia coli* is a gram negative bacterium that is commonly found in the lower intestine of warm-blooded organisms (endotherms). Most *E. coli* strains are harmless, but some, such as serotype O157:H7, can cause serious food poisoning in humans, and are occasionally responsible for costly product recalls (Vogt and Dippold; 2005). The harmless strains are part of the normal flora of the gut, and can benefit their hosts by preventing the establishment of pathogenic bacteria within the intestine (Hudault *et al*;2001 · Reid *et al*;2001). *Staphylococcus aureus* may occur as a commensal on human skin. It also occurs in the nose frequently (in about a third of the population) and throat less commonly. (Whitt and Abigail 2002). *S. aureus* a gram positive bacterium can infect other tissues when barriers have been breached (e.g., skin or mucosal lining). This leads to furuncles (boils) and carbuncles (a collection of furuncles). In infants *S. aureus* infection can cause a severe disease Staphylococcal scalded skin syndrome (SSSS) (Curran and Al-Salihi; 1980). Disease-causing microbes that have become resistant to antibiotic drug therapy are an increasing public health problem. Wound infections, gonorrhea, tuberculosis, pneumonia, septicemia and childhood ear infections are just a few of the diseases that have become hard to treat with antibiotics. One part of the problem is that bacteria and other microbes that cause infections are remarkably resilient and have developed several ways to resist antibiotics and other antimicrobial drugs. Another part of the problem is due

[1]Department of Animal Nutrition, College of Veterinary & Animal Sciences., [2]Department of Pharmacology & Toxicology College of Veterinary & Animal Sciences., [3]Department of Chemistry College of Basic Sciences and Humanities, G.B.Pant University of Agriculture & Technology, Pantnagar.U.S. Nagar, Uttarakhand
[4]Department of Chemistry, DSB,Campus Kumaun University, Nainital, Uttarakhand

to increasing use, and misuse, of existing antibiotics in human and veterinary medicine and in agriculture (Todar, 2004).

The use of phytochemicals as natural antimicrobial agents commonly called "biocides" is gaining popularity (Smid and Gorris, 1999). Essential oils are reported to posses antibacterial activity against several pathogenic bacteria and fungi (Conner 1993, Vukovic *et al.* 2007, Joshi *et al.* 2008). Present study has been undertaken to evaluate the anti bacterial activities of the essential oils isolated from rhizomes and seeds of *Zingiber roseum* and *Zingiber chrysanthum*(Zingiberaceae), aerial part of *Nepeta hindostana* (Lamiaceae), rhizomes, seeds, leaves and flowers of *Glycosmis pentaphylla* (Rutaceae), against the above bacterial strains.

**Material and Methods**

The plants, *Nepeta hindostana*, *Glycosmis pentaphylla*, *Zingiber roseam* and *Zingiber chrysanthum* were collected from Kumaun region of Uttarakhand in the month of July-August. The identification and authentication of plant specimens was confirmed from Botanical survey of India, Dehradun, and India vide letter no. BSI/NC 9(I) /2007-08/ Tech/1103 Dated 05.03.2008.

Fresh plant parts of different plants were subjected to hydro-distillation by Clevenger's apparatus for 8 hrs, Distillate were collected with diethyl ether and separated by separating funnel and dried over anhydrous $Na_2So_4$. The yield of the oils range from 0.4 - 1.5% (v/w).

The essential oils of *Nepeta hindostana,* root, seed, leave and flower oils of *Glycosmis pentaphylla*, rhizome and seed oils of *Zingiber roseum* and *Zingiber chrysanthum* were individually tested against three gram negative [*Pasteurella multocida* (MTCC- 1148), *Escherichia coli* (MTCC- 443), *Salmonella enlerica enterica* (MTCC- 3223), and one gram positive [*Staphylococcus aureus* (MTCC- 737) ] bacteria. Standard pure culture of these bacteria were procured from the Institute of Microbial Technology (IMTECH), Chandigarh, India as Microbial Type Culture Collection (MTCC) and maintained in the laboratory by regular sub culturing on to nutrient agar.

Antibacterial screening of the essential oils against test bacteria was done by Disc diffusion method as reported by Singh, *et al*. 2005 with slight modification. The bacterial suspension of 0.1 mL (diluted 10 times) was added to the previously prepared nutrient agar plate and bacterial strain was thoroughly spread over the agar surface, using bent rod. The sterilized Whatman filter paper No. 1 disc (5 mm in diameter) was thoroughly soaked with essential oils (50 ìL) and placed in the inoculated plates. These plates were incubated at 37°C for overnight to observe the zone of inhibitions (mm). The results were compared with the standard antibiotics.

MIC (minimum inhibitory concentration) levels of the essential oils were determined by tube dilution method (Robert and Scott, 1966). Pure essential oils were used as the working solution. The lowest concentration of the essential oil preventing the growth (manifested by turbidity) was taken as MIC of that oil.

**Results and Discussion**

All the essential oils showed broad antibacterial spectrum expect *Zingiber chrysanthum* seed essential oil (ZCSO) and *Glycosmis pentaphylla* leaf essential oil (GPLO), which were inactive against *P. multocida* and *E.coli* respectively as determined by disc-diffusion method.

*Z.roeeum* rhizome oil (ZRRO) and *Z.roeeum* seed essential oils(ZRSO showed antibacterial activity by producing inhibition zones of 15-20mm and 11-20mm respectively. Maximum activity was shown by ZRRO against *S. aureus*(20mm) and ZRSO against *S.enterica* (20mm) respectively. Zone of inhibition to show the antibacterial activity by *Z.chrysanthum* rhizome oil(ZCRO) and *Z.chrysanthum* seed oil (ZCSO)was observed 10-16 mm and 09-16 mm, with maximum activity of ZCRO against *S.enterica* (16mm) and ZCSO against *E.coli* (16mm) respectively. *Nepeta hindustona* essential oil (NHEO) showed antibacterial activity against both gram negative and gram positive bacteria producing zone of inhibition ranging 12-19 mm, maximum against *S.enterica* (19mm) and minimum against *P.mutlicodia* (12mm) respectively. *Glycosmis pentaphylla* rhizomes oil(GPRO), *G. pentaphylla* seeds oil (GPSO), *G. pentaphylla* leaf oil (GPLO) and *G. pentaphylla* flowers oil (GPFO) also showed broad spectrum antibacterial activity showing inhibition zones 9-14 mm, 18-21 mm, 8-10 mm and 12-18 mm, maximum

**Table 1:** Anti bacterial assay of the essential oils.

| S.N | Essential Oils | Inhibition zone [mm] (MIC [ì L/mL]) | | | |
|---|---|---|---|---|---|
| | | *E.coli* | *S.enterica* | *P.multocida* | *S. aureus* |
| 1. | ZRRO | 15(3.90) | 18(1.95) | 16(3.90) | 20(0.97) |
| 2. | ZRSO | 11(15.62) | 20(0.97) | 16(3.90) | 14(7.81) |
| 3. | ZCRO | 15(3.90) | 16(3.90) | 10(31.25) | 12(31.25) |
| 4. | ZCSO | 16(3.90) | 11(15.62) | n.a. | 09(31.25) |
| 5. | NHEO | 14)(7.81) | 19(0.97) | 12(15.62) | 13(7.81) |
| 6. | GPRO | 14(7.81) | 09(31.25) | 12(15.62) | 16(3.90) |
| 7. | GPSO | 20(0.97) | 18(1.95) | 18(1.95) | 21(0.97) |
| 8. | GPLO | n.a. | 10(31.25) | 11(31.25) | 08(62.50) |
| 9. | GPFO | 13(15.62) | 18(1.95) | 10(31.25) | 12(15.62) |
| 10. | Gentamycin | 46(0.019) | 39(0.019) | 42(0.039) | 41(0.0048) |

n.a =not active, Gentamycin= standard

ZRRO= *Zingiber roseum* rhizome essential oil, ZRSO= *Zingiber roseum* seed essential oil, ZCRO= *Zingiber chrysanthum* rhizome essential oil, ZCSO= *Zingiber chrysanthum* seed essential oil, NHEO= *Nepeta hindostana* essential oil, GPRO= *Glycosmis pentaphylla* rhizome essential oil, GPSO= *Glycosmis pentaphylla* seedessential oil, GPLO= *Glycosmis pentaphylla* leaf essential oil, GPFO= *Glycosmis pentaphylla* flower essential oil

activity of GPRO and GPSO against *E.coli* (14mm & 20mm) respectively. GPLO and GPFO showed maximum activity against *P.multicodia* and *S.enteria* with maximum inhibition zones of 11mm and 18 mm respectively.

The respective MIC values of the essential oils against the above bacterial strains were determined by tube dilution method (values in parenthesis in table-1). The values ranged from 0.97 to 62.5 ìL/mL depending on the susceptibility of the tested organisms. The zone of inhibitions and MIC values are recorded in table-1, Variation in the antimicrobial activity against tested bacterial strains could be attributed to the difference in the chemical composition of the essential oils. These essential oils can be used as antimicrobial agents. The main reasons for their suitability are their isolation from natural origin and lower risk that pathogens can develop resistance to the mixture of components. Since it is difficult to achieve mutation in entire genome responsible for developing resistance against all the components that make up the oils.

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# Evaluation of micro minerals status of Vrindawani calves of different age groups

*Sarita Devi[1], M.I. Yatoo[2], Pankaj Kumar[3], Rupasi Tiwari[4] and M.C. Sharma[5]*
Division of Medicine, IVRI, Izatnagar.

**Abstract**

Present investigation was conducted to evaluate the micro minerals (Cu, Fe and Zn) profile of Vrindawani calves reared at the Cattle and Buffalo farm, LPM section, IVRI, Izatnagar, and to monitor their health and nutritional status. Four different age groups were made, each comprising of six male and six female calves. Collected blood samples were subjected to wet digestion. Atomic absorption spectrophotometry (AAS 4141, ECIL, Hyderabad, India) was used for the estimation of micro minerals (Cu, Fe and Zn) and their concentration were expressed in parts per million (ppm). Significant ($P<0.05$) variation was observed in Zn levels between different age groups but not in the levels of Cu and Fe. Also levels of copper were low in relation to standard reference values.

**Keywords:** Micro minerals, Vrindawani calves, Nutritional status

Minerals are inorganic substances, present in all body tissues and fluids and their presence is necessary for the maintenance of certain physic-chemical processes. Though required in small quantities, minerals are essential for optimal body functions (Sharma *et al.,* 2005). Minerals may be broadly classified as macro (major), micro (trace) elements and ultra trace elements. The trace minerals are present in body tissues in very low concentrations and often serve as components of metallo-enzymes and enzyme cofactors, or as components of hormones of the endocrine system (Speer, 1996). The issue of evaluation of individual micro element deficits in the neonatal life of calves has been discussed only superficially and evaluation is often made using the same values as for adult animals or knowledge of metabolism of a particular micro element is applied to other micro elements (Pavlata *et al.,* 2004). Also trace mineral deficiencies can have a great impact on animal performance as physiologic functions are progressively affected by deficiencies and to draw optimum production from animals, gap of trace mineral deficiency need to be abridged. Keeping in view of these facts, the present study was conducted to evaluate the micro minerals profile of Vrindawani calves of different age groups reared on the Cattle and Buffalo farm, LPM section, IVRI, Izatnagar.

## Materials and Methods

To evaluate the micro minerals status of Vrindawani calves of different age groups reared at the Cattle and Buffalo farm, LPM section, IVRI, Izatnagar, four different age groups, comprising each of six male and six female calves, were made (Table 1). Before collecting the blood samples from the animals, the following details of selected calves were recorded i.e. age, sex, breed, and physiological status (healthy or sick). These animals were maintained under identical feeding and management practices. A total of 48 blood samples were collected from calves.

### Collection of blood samples

About 10 ml of blood was collected from jugular vein using sterile disposable syringe in a sterile, acid-washed test tubes containing heparium as anticoagulant and stored at $4^0$C till further processing.

### Digestion of blood samples

Samples were digested as per procedure described by Kolmer *et al.,* (1951). Three ml of blood sample with equal volume of concentrated $HNO_3$ was mixed in the digestion tube. The samples were kept overnight at room temperature followed by low heat digestion (70-$80^0$C) using heat/digestion bench, until the volume of samples was reduced to about 1 ml. To this 3ml of double acid mixture (3 part concentrated $HNO_3$ and 1 part 70% $HCIO_4$) was added and low heat digestion continued until the digested samples became watery clear and emitted white fumes. As per need 3 ml of double acid mixture was again added followed by low heat digestion repeated a couple of times. Heating was done till the final volume was reduced to approximately 0.5 ml. Final volume of filtrate was made up to 15 ml with triple distilled deionized water after luke warming the solution.

While digestion of blood samples, simultaneous

[1]Ph.D., [2]M.V.Sc. Scholars, [3]Scientist, Division of Medicine, IVRI, Izatnagar., [4]Senior Scientist & I/C ATIC, IVRI, Izatnagar.
[5]Director, IVRI, Izatnagar, U.P.

digestion of reagent blank was undertaken and final volume was similarly made up to 5ml to have blank.

AAS (Model no. AAS 4141, EICL, Hyderabad, India) was used for the estimation of micro-minerals (viz. Copper (Cu), Iron (Fe) and Zinc (Zn)) and concentration was expressed in parts per million (ppm).

Differences in blood concentration of Cu, Fe and Zn among different groups were compared using ANOVA and Duncan's Multiple Range Test (Snedecor and Cochran, 1994).

**Results and Discussion:**

The mean (±S.E.) blood concentration of Cu, Fe and Zn for groups I, II, III, and IV has been given in Table 2.

In the present study mean level of in all the four groups is falling in the marginal deficiency range i,e. 0.16±0.01 to 0.20±0.01 ppm with the lower level in the fourth group. This may be due to the fact that absorption of copper decreases with increase in age (Smart *et al.,* 1981).

In the present study mean blood iron concentrations of different age groups was in the range of 13.58±0.21 to 14.21±0.21 ppm against the critical limit of 0.89 ppm as suggested by McDowell (1987). The mean levels of iron in different groups showed no significant variation. Iron requirements of livestock are not well established, however, it is known that young animals have higher requirements than adults (Judson and McFarlane, 1998). For adult animals, the Fe requirement is estimated to be 30-60 mg/kg, while the requirement of calves and lambs is thought to be 100 mg/kg. In our investigation, the forage was well balanced to supply Fe so animals did not exhibited any symptoms of this deficiency, perhaps due to availability of Fe to animals from reserves, which are considered sufficient to prevent serious anaemia (Arthington and McDowell, 2005).

The mean blood Zn concentrations of different groups were 0.46±0.06 to 1.06±0.17 ppm respectively. In our study mean levels of zinc in the group I, II, IV and II, III shows no significant variation but there is significant variation between the group I, II and III. These findings are in association with Turkar (2010) whom stated that in her study pregnant animals and calves recorded lower serum zinc values as compared to other physiological groups. This may be due to positive correlation of zinc of milk to dietary intake in case of neonatal feeding (Underwood, 1981). The minimum Zn requirement of livestock varies with the chemical form or combination of the diet (McDowell, 2003).Based on this investigation there warranted need of Zn supplementation to livestock grazing therein and also there is a need for maintaining the relative proportions of the concentrations of Ca, Cu, Fe, and Cd in soil and forages with which Zn interacts in the process of absorption and utilization (Arthington and McDowell, 2005).

It is generally true that the microelement status of newly born calves is largely determined by the microelement status of the dams during pregnancy because microelements can be transferred via the placenta to the fetus (Hostetler *et al.*, 2003). In adequate supply of minerals to ruminants is often seasonal resulting from increased demands in case of pregnancy, lactation or rapid growth coinciding with reduced mineral contents or availability in pastures. Seasonal variations in mineral concentrations in livestock have been recorded in different countries (McDowell, 2003).

The present study showed significant variation of Cu and Zn concentration between different groups. Hence it is concluded that ascertaining micro-mineral status of calves is helpful to prevent related deficiencies, monitoring the quality of their mineral nutrition so that diet and management can accordingly be adjusted

**Table 1:** Sampling protocol.

| Groups | Age Group | Number of calves (M+F) |
|---|---|---|
| I | 0-6 month | (6+6)12 |
| II | 6-12 month | 12 |
| III | 12-18 month | 12 |
| IV | 18-24 month | 12 |

**Table 2:** Cu, Fe and Zn concentration in blood samples of calves of different age groups.

| Groups | Cu (ppm) | Fe (ppm) | Zn (ppm) |
|---|---|---|---|
| I (0-6month age) | 0.19±0.015 | 14.15±0.21 | 1.06±0.17$^{a}$ |
| II (6-12month age) | 0.19±0.02 | 14.21±0.21 | 1.04±0.14$^{a}$ |
| III (12-18month age) | 0.20±0.01 | 13.58±0.21 | 0.46±0.06$^{b}$ |
| IV(18-24month age ) | 0.16±0.01 | 14.03±0.63 | 0.71±0.10$^{ab}$ |

Values with different superscript vary significantly (P< 0.05) between groups.

keeping in view that milk is poor source of some essential micro-minerals especially copper and iron.

**Acknowledgment**

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# Endoscopic diagnosis of upper respiratory tract affections in horses

*P. Pothiappan[1], P. Dhanapalan[2], S.R .Srinivasan[3], G. Vijayakumar[4] and P. Selvaraj[5]*
Centre of Advanced Studies in Veterinary Clinical Medicine, Ethics and Jurisprudence,
Madras Veterinary College, Chennai-600 007, Tamil Nadu.

## Abstract

Endoscopy is an important component of the evaluation of poor performance, particularly in horses with a history of respiratory noise. Left laryngeal hemiplegia was the most common abnormality identified followed by Dorsal displacement of soft palate and Pharyngeal lymphoid hyperplasia by endoscopy.

**Key Words:** Endoscopy, Horses, Exercise intolerance, Upper respiratory tract, Poor performance

Abnormalities of the upper air way were commonly identified as the cause of poor performance in Thoroughbred race horses. (Holcombe and Ducharme, 2004). Dynamic obstruction of the upper respiratory tract was a common cause of poor performance in equine athletes (Morris and Seeherman, 1991; Martin *et al.*, 2000).

Dorsal displacement of soft palate in race horses is a multifactorial respiratory dysfunction (Parente *et al.*, 2002). Examination of the upper respiratory tract is most often performed by endoscopy at rest. Reasons for endoscopy include the investigation of an abnormal respiratory noise and poor performance (Kannegieter and Dore, 1995; Lumisden *et al.*, 1995). Endoscopy aids in direct visualization of structural and functional disorders of the upper respiratory tract, which becomes functionally obstructive during exercise or at exertion. Although many studies have been conducted on the prevalence of upper respiratory tract disorders in Thoroughbred race horses, (Brown *et al.*, 2005), the prevalence of these disorders has not been documented in available Indian breeds of horses like Kathiawari and Marwari, which are used for draught and show purposes.

## Materials and methods

Endoscopy study of the upper respiratory tract in apparently healthy and clinical cases of horses were conducted with Video Endoscope, Karl Storz (Type No.60914 PKS) with an outer diameter of 9.8 mm and biopsy channel diameter 2.8 mm. Endoscopy images were captured and processed with image documentation software. Endoscope and accessories were cleaned thoroughly and sterilized using 2 per cent glutaraldehyde solution between examinations.

Preparation and restraining of the patient was done as suggested by Brown *et al.* (2005) and Lane *et al.* (2006). Horses were restrained by a handler and a nose twitch was applied. Some non-cooperative horses were administered xylazine hydrochloride (@ 0.55 mg/kg i/v) for sedation.

Endoscopy evaluation of upper respiratory tract was performed as per Brown *et al.* (2005). A 1.6 m long video endoscope probe was inserted into nostril and the ventral meatus, turbinates, nasopharynx and larynx were examined. The image was displayed on a monitor. The endoscopic examination included careful scrutiny of the pharynx, larynx and guttural pouch. The position of the soft palate and epiglottis was verified. The larynx was examined for asymmetry, asynchrony, flutter or lack of movement and the presence of mucosal lesions. The epiglottis was evaluated for its length and width (assessed subjectively as normal, small or large), shape and rigidity. Lesions on the arytenoids cartilage were identified as one or more erosions or ulcerations in the mucosal surface.

## Results

In healthy control group, endoscopic view of upper respiratory tract was normal. Systemic evaluation of upper respiratory tract through endoscopy revealed normal anatomical confirmation of nasal cavity indicated by pink and moist mucosa over dorsal concha, ventral concha and meatus with no anatomical deviations. In the horses examined, the nasal cavity was occupied by the nasal concha, which project medially. The dorsal concha occupied the dorsal aspect of nasal cavity. The ventral concha was shorter than the dorsal one. The dorsal meatus was a narrow passage bound dorsally by the roof of the nasal cavity and ventrally by the dorsal concha. The middle meatus lead between the dorsal concha and the ventral concha and was

somewhat smaller than the dorsal meatus. The ventral meatus was bound dorsally by the ventral concha and the ventral floor of the nasal cavity. Nasal turbinates were found to have normal vasculature, fragile with no distortions and anatomical secretions. The nasopharynx, oropharynx and laryngopharynx were found to be normal in vasculature and anatomical structures. The laryngeal anatomy was found to be normal without any anatomical deviations or dynamic abnormalities. Adduction, resting and abductory functions were also found to be normal. The vocal cord, rimaglottis and pharyngeal lymphoid tissue were also found to be normal.

In clinical group, horses referred to Madras Veterinary College Teaching Hospital with a history of poor performance and exercise intolerance were studied for any affections in upper respiratory tract. Endoscopic findings of the upper respiratory tract in clinical group horses are given in (plate 1-4). Clinical cases examined include four gelding and one mare of 6-12 years of age group. Out of which, one six years old mare was observed to have dorsal displacement of soft palate during resting endoscopic examination. Respiratory noise, as in this case, was the presenting complaint in most horses that had dorsal displacement of soft palate. Pharyngeal lymphoid hyperplasia and Left Laryngeal hemiplegia were diagnosed in a six year old gelding Thoroughbred and in the gelding of 7 years old Thoroughbred, 8 years old kathiawari and 12 years old Thoroughbred, respectively during resting endoscopic examination. Respiratory noise and exercise intolerance were the presenting complaint in most horses with Left laryngeal hemiplegia.

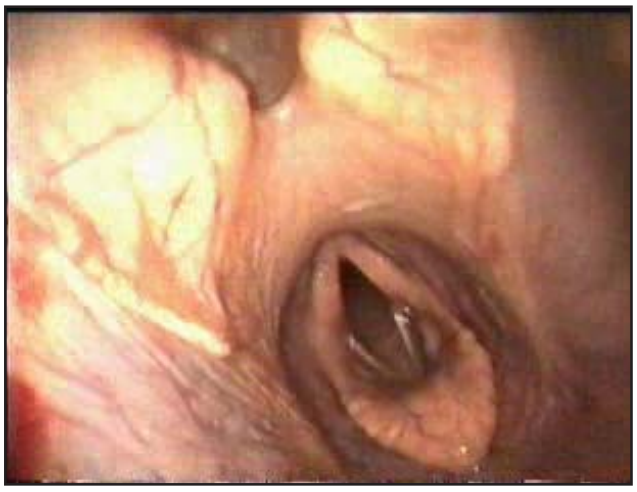

**Plate - 1.Normal nasopharynx**

**Plate - 2. Pharyngeal lymphoid hyperplasia**

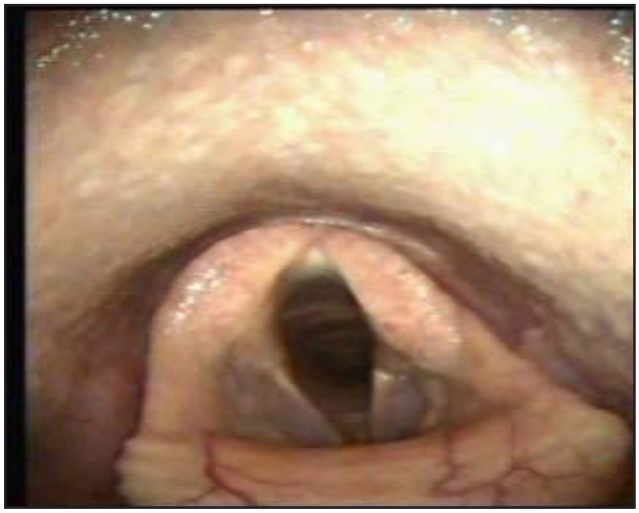

**Plate – 3. Left laryngeal hemiplegia**

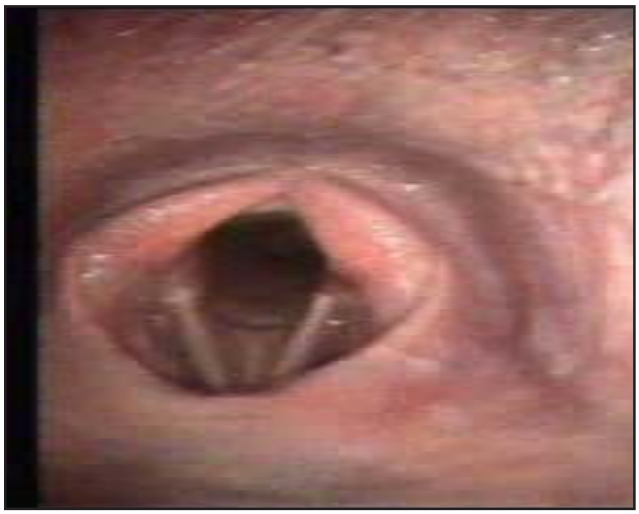

**Plate -4. Dorsal displacement of the soft palate**

## Discussion

Three horses in this study had left laryngeal hemiplegia grade II as evident by endoscopic findings such as symmetrical and synchronized abduction and adduction with transient asynchrony or delayed abduction of arytenoids cartilage (Plate 3). Similar dynamic abnormalities were reported by Brown *et al.* (2005). One horse in present study had dorsal displacement of the soft palate as evident from endoscopic findings such as poor visualization of epiglottis and billowing of soft palate dorsally during exhalation (Plate 4). Similar dynamic abnormalities were reported by Parente *et al.* (2002). One horse in present study had pharyngeal lymphoid hyperplasia as evident from endoscopic findings such as hyperplasia of the tonsilar tissue to the dorsal pharyngeal recess and the roof of the pharynx (Plate - 2). Besides lymphoid hyperplasia, few small masses arising from dorsal pharyngeal recess were also observed. Those findings were in concurrence with those reported by Byars, (2004).

In all the five horses evaluated in this study, endoscopy was found to be the most useful parameter for the diagnostic confirmation of upper respiratory disorders. Morris and Seeherman (1990) reported the functional abnormalities of the upper respiratory tract such as epiglottic entrapment, dorsal displacement of soft palate and laryngeal hemiplegia, as a cause for decreased diameter of the air flow tract in adult horses during strenuous exercise which resulted in reduced performance.

Present study revealed a positive correlation between poor performance and upper respiratory tract abnormalities like Left laryngeal hemiplegia, dorsal displacement of the soft palate and Pharyngeal lymphoid hyperplasia.

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# Prevalence of gastrointestinal parasites in caprine of ravines region in Uttar Pradesh

*Rashmi[1], Rupasi Tiwari[2], M.C. Sharma[3] and M. Sankar[4]*
Division of Parasitology, Indian Veterinary Research Institute, Izatnagar-243122, Bareilly, U.P.

## Abstract

The present study was carried out in the Etawah district of Uttar Pradesh as the district falling in the ravines region, is having the highest goat population and native place of Jamunapari goat. Faecal samples collected randomly, were examined by McMaster method for parasitic infestation, cultured for identifying the composition of nematode population and further studied the benzimidazole resistance by egg hatch test (EHT). The faecal samples examination showed the prevalence of strongyle, strongyloidosis and coccidial infection. The culturing of faecal samples revealed majority of the strongyle infection is due to *Haemonchus contortus* (40-60%) followed by *Trichostrongylus* spp (15%) and *Oesophagostomum* spp (<10%), moreover, strongyloidosis larvae were also observed in the culture. There was no evidence of benzimidazole resistance after testing the parasitic eggs by EHT.

**Keywords:** Coccidia, Egg Hatch Test, *Haemonchus contortus*, Ravine, Strongyles

The goat rearing during the last few decades has become steadily important in the rural economy, particularly in the arid and semiarid regions, where they can sustain on sparse vegetation and extreme climatic conditions. More than 70% of the landless, marginal and small farmers of the rural India rear them. The goats are increasing @3.5% per annum; in spite of 43% slaughter and 10-15% goat mortality per annum. The goats are widely distributed in all the agro-ecological zone of India including ravines (Rashmi, 2010). However, parasitic infections hindered the economic profit of the livestock farming community throughout Asia (FAO, 2002).

Ravines are a result of formation of gullies with in unconsolidated, relatively loosely bound material such as soft sedimentation. Although ravines and gullies occur all over India, the largest incidence is found in Uttar Pradesh spread over 12.30 lakh hectares mainly found in Etawah, Mathura, Agra, Mainpuri, and Kanpur.

Effective control of internal parasites in small ruminants is one of the most difficult challenges encountered by veterinarian in practice (Sharma, 1968). For control of the parasite infestations, accurate identification of parasite population in the particular locality is essential. Because little information was available regarding parasitic infestations in ravine area of the India, the present work was planned to study the prevalence of parasitic infections as well as the composition of strongyle population and benzimidazole resistance in strongyle parasites of the goat reared in ravines region of Uttar Pradesh with specific reference to Etawah district.

## Material and Methods

### Faecal Examination

Faecal samples were collected directly from the rectum with the help of index finger to avoid contamination. To obtain accurate information with regard to the severity of infestation, the number of egg per gram of faeces (epg) was determined by the McMaster egg counting technique (Coles, 1992).

### *In vitro* Egg Hatch Test (EHT)

The faecal samples were homogenized using pestle and mortar and poured through a 100 mesh (0.15-mm aperture) sieve into a bowl. The filtrate was centrifuged for 2 minutes at 1300-1500 rpm and saturated sodium chloride solution added until meniscus formed above the tube, a cover slip was put on and centrifuged for two minute at 1000 rpm. The cover slip was removed carefully from the tubes and washed off the eggs into a conical glass centrifuge tube, which was filled with distilled water and centrifuged for 2 minute at 1500 rpm. Supernatant was discarded and the sediment resuspended with water. The number of eggs per ml was estimated and diluted to required concentration (approximately 200 eggs per ml).

EHA was performed as previously described

[1] Ex- M.V.Sc student, Division of Extension education
[2] Senior Scientist & I/C, ATIC, IVRI, Izatnagar
[3]Director, IVRI, Izatnagar
[4] Scientist, Division of Parasitology, IVRI, Izatnagar

by Coles *et al.* (1992). Pure Thiabendazole (TBZ) was dissolved in aqueous HCl. Assays were carried out using Sterilin 24 multiwell plates (Laxbro). Approximately 200 eggs per well were incubated for 48 h at 26°C in serial concentrations of TBZ. The final concentrations of TBZ used were 0.01, 0.03, 0.05, 0.07, 1.0, 1.5, 1.75, 2.0, 2.5 and 3.0 µg /ml. After 48 h, eggs (dead, embryonated) and hatched first-stage larvae in each well were counted and correction for natural mortality was calculated. $ED_{50}$ values (concentration of TBZ producing 50 percent inhibition of hatching) were analysed by regression analysis. The tests were carried out with three replicates for each drug concentration plus control well and were repeated three times for each strain. Eggs with an $ED_{50}$ value in excess of 0.1µg TBZ per ml indicate BZ resistance.

**Result and Discussion**

**Prevalence of parasites and parasitic load**

It was observed that the general appearance of the goat was good in the study area but the examination of faecal sample of the goat, revealed different parasitic infection. The majority of the goat samples (47%) were infected with the strongyles and coccidiosis, 22% samples were positive for coccidiosis, 18% samples and 8% animals were infected with strongyles, strongyloides & coccidiosis and strongyloides & coccidiosis, respectively. Mixed parasitic infections are very common in Indian conditions and were documented well by various workers (Ghosh *et al.*, 1976; Choudhary, 1994; Sanyal and Le Jambre, 1996; Sharma and Nem Singh, 1997).

**Anthelmintic resistance**

It was found that in the cultures, the larvae developed to the infective stage (Third larval stage) in about 8-10 days. The infective larvae migrated to the water from 8th day onwards. It was observed that most of the larvae remained alive in the cultures for more than twenty days at room temperature.

Majority of the faecal culture (40-60%) was containing *Haemonchus contortus* while around 20-30% found *Trichostrongylus* spp. and *Oesophagostomum* spp. Other less important larvae including strongyloides (10%) was also observed**.** Gastrointestinal nematodes (GI) are ubiquitous parasites of livestock in Asia including India (Soulsby, 1982). Its occurrence depends on the presence of biotopes suitable for the development and transmission of infective larvae to the definitive host. GI parasite infection is a worldwide problem and prevails mostly in tropical and sub-tropical countries where hot and humid climate is comparatively higher than temperate regions (Kalita *et al.*, 1978).

It was found that in the cultures, the larvae developed to the infective stage in about 4-6 days. The infective larvae migrated to the water from 5th day onwards. It was observed that most of the larvae remained alive in the cultures for more than twenty days at room temperature.

The $LD_{50}$ values obtained in the EHA for TBZ, according to the WAAVP method (Coles *et al.*, 1992), indicated agreement in ascribing susceptible on all samples. TBZ is the test standard benzimidazole compound which is classically used in the egg hatch test because of its high solubility (Coles *et al.*, 1992). The nematode species mainly involved in these studies were *Trichostrongylus* spp., *H.contortus* and *Oesophagostomum* spp based on culture studies.

Although, it is effective diagnosis for determining the presence and the level of BZ resistance, there are few limitations in performing the assay. The requirement for undeveloped eggs can be overcome by anaerobic storage of fresh eggs (Hunt and Taylor, 1989). Moreover, this test is handicapped to detect the initial stage of BZ resistance development; it can detect when the resistant level reach above 25% of worms in the population (Martin *et al.*, 1989).

The results of this study suggests absence of BZ resistance on goats in interior part of Uttar Pradesh especially ravine region. It is generally accepted that the selection pressure generated by frequent use of the anthelmintic treatment is responsible for the development of anthelmintic resistance. In the study area, animals were not treated with any of the anthelmintic treatment instead deworming was with indigenous method like seeds of Papaya (*Carica papaya*) fed directly to the animal. As such goats of ravine region of Etawah district were having high incidence of gastrointestinal parasites as livestock owner of the region are not using deworming practice.

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**Clinical Articles**

# Homeopathic management of pox infection in captive pigeons

*P. Bhatt[1], S.K. Shukla[2] and D.K. Gupta[3]*
Veterinary Clinics, College of Veterinary and Animal Sciences,
G.B.Pant University of Agriculture and Technology, Pantnagar-263145, U.S. Nagar, Uttarakhand.

## Abstract

A local breed of pigeon with the history of having cutaneous nodular lesions on feathered and unfeathered parts of the body was presented to the veterinary teaching hospital of the college. Cutaneous pigeon pox infection was suspected on the basis of clinical signs, gross lesions, predisposing factors and absence of any diphtheritic lesions. The successful management of the case with homeopathic antiwart medicine and supportive therapy is discussed.

**Keywords:** Pigeon pox; cutaneous pox; antiwarts and homeopathy

Pigeon pox is caused by a virus belonging to the avipoxvirus subgroup under the pox virus group. The avipoxvirus subgroup includes a number of closely related viruses such as fowl pox, pigeon pox and canary pox. The avian pox affects chickens, turkeys, pigeons and canaries and many wild species of birds (Tripathy, 1991). There are two clinical forms of pigeon pox: cutaneous and diphtheritic. In cutaneous form the lesions appear on featherless areas of the body like the eyelids, around the beak and occasionally elsewhere on the body. The lesions start as small papules and gradually progress to a wart-like thick dark scab. Eventually the scab falls off and complete healing generally takes place within four weeks of infection. This form of the disease is seldom life-threatening. The second form of pigeon pox involves the mucous membranes of the mouth, pharynx, larynx and trachea.

Occasionally, a mixed form may occur with cutaneous scabs as well as soft lesions in the respiratory or even the intestinal tract. The disease develops slowly resulting in mortality and morbidity in all age groups (Mohan and Fernandez, 2008). Pox virus is not always fatal but can predispose the affected bird to secondary infections and accidents (Reece, 1989). Bacteria may gain access causing secondary infection and resulting in a purulent discharge and necrosis. Deaths in few cases have been attributed to heavy parasitic load or poor body conditions (Mohan and Fernandez; 2008, Singh *et al.*, 1990).

The diagnosis of the cutaneous form was confirmed by the presence of characteristic *Bollinger bodies* in epithelial cells of epidermis observed in histopathologic analysis, by electron microscopy for viral particles in epidermal cells, or by virus isolation (Heuschele, 1986 and Randall and Reece, 1996) but in some cases a pox virus infection can be suspected by external clinical examination and gross lesions (Heuschele, 1986). Many cases of pigeon pox infection have been reported from various parts of the world (Mohan and Fernandez; 2008, Singh *et al.*, 1990; Manuel *et al.* 2004; Cubillos *et al.* 1979; Khogali and Obeid, 1974). The present paper reports probable pox infection in captive pigeons and its therapeutic management.

A local breed of pigeon was brought to the veterinary teaching hospital with the history of having cutaneous nodular lesions on head, feathers and cloaca. The owner reported that similar lesions were also observed in three other pigeons, one of which died two days back. The affected pigeons remained isolated from the flock, became anorectic and progressively weak. He also informed that the disease occurred few days after introduction of new birds from his native place. The owner interested in pigeons housed around 60 birds in a room. On clinical examination, it was found to be dull, emaciated and weak. Several cutaneous yellow, round nodular lesions with rough and firm masses were found in both feathered and unfeathered parts of the body, *viz* head, wings and cloaca. The lesions measured around 0.5 to 1 cm in diameter and some were superficially ulcerated. No any diphtheritic lesions were found on the affected bird. A visit to the owners place revealed that the birds were housed in a very small

[1]Assistant Professor
[2] Professor, Veterinary Medicine
[3] Assistant Scientist, Clinical Veterinary Medicine, GADVASU, Ludhiana

[1]Thuja-200® M/s SBL Pharmaceticals
[2]Terramycin® M/s Pfizer Pharmaceuticals
[3]ABDEC® M/s Parke-Davis

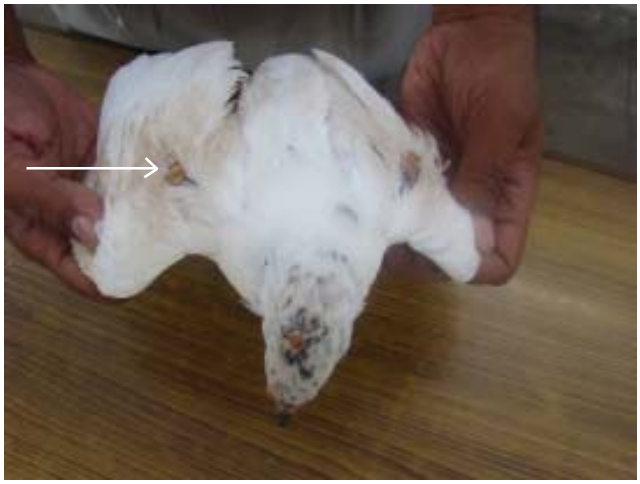

**Fig I a:** Pox lesions on wings

**Fig I b:** Disappearance of lesions after treatment

**Fig II a:** Pox lesions on the head

**Fig II b:** Disappearance of lesions after treatment

**Fig III a:** Superficially ulcerated pox lesions on the cloaca

**Fig III b:** Disappearance of lesions after treatment

room with no proper lighting and ventilation. The birds appeared to be under stress and were dull. Based on clinical signs, gross lesions and predisposing factors, it was suspected to be a case of pigeon pox and treated accordingly.

The affected birds were prescribed Thuja[1] @ 1 drop per bird twice daily for a period of seven days,

oxytetracycline[2] @ 20 mg/kg b.wt. orally for five days along with multivitamins[3] @ one drop orally for a period of seven days. The owner was advised to keep the affected birds separately and make provision for sufficient space for the captive pigeons. Multivitamins were also advocated for the other healthy birds for a week.

After one week, the owner reported that all the affected birds have recovered completely and all the birds were thriving well with no appearance of any new case and mortality. Since there appears to be no effective anti viral treatment for the disease as such, in the present study a homeopathic medicine Thuja having potent antiwart activity was tried in birds. Thuja contains thujone as the main molecular component, which primes the response of an immune system element called the gamma-delta T cell, when used as a wart removal remedy. These cells are the first line of defense against many types of viral and bacterial infections. They even have some anti tumor activity. The results of the therapy are depicted in figures I a&b, II a&b and III a&b.

Antibiotics were prescribed to combat bacterial infections secondary to pox infection. In the present study, antibacterial like oxytetracycline was prescribed to manage secondary bacterial infection which is common in cases of pigeon pox. Multivitamins were prescribed to alleviate stress in the ailing birds and hasten recovery. Parasitism and poor body conditions have been reported to complicate the disease condition in the flock and mortalities have been reported (Mohan and Fernandez; 2008, Singh *et al*., 1990). Confinement of birds in a small room resulted in stress which might have precipitated the infection and mortality in the present case.

The present case report concluded that Thuja, a homeopathic medicine could be of immense use in the alleviation of warts in cases of pox. Identification of commonly prescribed homeopathic medicines and the clinical indications for each specific homeopathic medicine could result in a simplification of homeopathic prescribing in veterinary science.

**Acknowledgement**

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# *Datura* poisoning and its therapeutic management in horse-a case report

*A.K. Tripathi, J.S. Soodan and Gagandeep Singh*
Division of Veterinary Clinic & Teaching Hospital, Faculty of Veterinary Sciences and Animal Husbandry, SKUAST-J, R.S. Pura-Jammu-181102, J. & K.

## Abstract

A male horse was presented to college clinics with the history of accidental ingestion of Datura fruits. Clinical examination revealed fever, tachycardia, polypnoea with dyspnoea, bilateral abdominal distension, abdominal pain, mydriasis, anorexia, lack of thirst, cessation of defecation and urination and drying of mucous membranes. The animal responded to the treatment with pilocarpine hydrochloride (5%) along with $MgSO_4$, activated charcoal and supportive treatment.

**Keywords:** *Datura*, Horse, Pilocarpine hydrochloride, Poisoning.

The present case report describes a case of *Datura* poisoning and its therapeutic management in a horse. An adult horse weighing around 350kg, aged 4 years was presented to college clinics with the history of complete refusal of food, lack of thirst, cessation of defecation and urination after accidental ingestion of *Datura* fruits. Clinical examination revealed increased rectal temperatutre ($104.6^0$F), tachycardia (98/min), polypnoea (62/min) with dyspnoea, bilateral abdominal distension, mydriasis, dry mucous membranes, diffusely reddish conjunctivae, staggering gait and hyperesthesia. Moderate degree of restlessness and abdominal pain was also recorded. On auscultation of intestine, tympanic sounds was andible. The rectal examination revealed distention of colon. The horse was diagnosed to be suffering from *Datura* poisioning.

Immediately, gastric decompression was done by nasogastric intubation and approximately one litre of greenish brown fluid removed. After that solution of 200 g $MgSO_4$, 400 g activated charcoal and 100 ml Bloatosil in 4 lit water was administered through nasogastric tube and 10 litres of normal saline was administered, intravenously. Apart from this Strepto-penicillin 5 gm sid and Tribivet 10ml sid was administered im for 3 days. As an antidote, Pilocarpine hydrochloride (Sigma-Aldrich) 5% solution was prepared and administered subcutaneously (2ml) on 1st day every 6 hrs, 2nd day every 8 hrs, 3rd day every 12 hrs, after administration of pilocarpine hydrochloride, the clinical status of animal was continuously monitored. The clinical parameters normalized on 3rd day after 8 doses of pilocarpine, and animal recovered fully on 4th day.

The toxic principles of *Datura* plants are tropane belladonna alkaloids which possess strong anticholinergic properties. All parts of the plant are toxic, poisoning results in widespread inhibition of parasympathetic activity (Boumba *et al* 2004). The toxic effect of Jimson weeds (datura) results from the antimuscarinic action of the alkaloids (Lazzarini *et al.*, 2006). The increased heart rate might be due to removal of the parasympathetic component of vagal block, and polypnoea with dyspnoea are probably a consequence of the colic. Similar clinical findings have been reported earlier in *Datura* poisioning (Gerber *et al.*, 2006 and Soler-Rodriguez, 2006).

Pilocarpine hydrochloride was used as an antidote, a cholinomimetic with a direct effect (antagonist of cholinoreceptors).

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# Diagnosis and therapeutic management of Geriatric Vestibular Disease in a dog

*Sujata Turkar, N. Chand, K. Dua and S.K. Uppal**
Department of Clinical Veterinary Medicine, Ethics & Jurisprudence
Guru Angad Dev Veterinary and Animal Sciences University Ludhiana, 141004, Punjab

## Abstract

A 14 year Pomeranian dog was diagnosed with geriatric vestibular disease on the basis of compatible history, clinical signs (head tilt, nystagamus, incordination and nausea) and by exclusion of other causes of peripheral vestibular disease. Improvement in clinical signs was seen within a week with supportive treatment.

**Keywords:**

Vestibular disease (idiopathic vestibular syndrome) is a common cause of vestibular disturbance of old aged dogs. It is characterized by the acute onset of non-progressive peripheral vestibular signs in geriatric dogs. There is a sudden onset of ataxia, head tilt, nystagmus and occasionally vomiting. The aetiology of this disorder has not been determined. Diagnosis is based on compatible history, clinical signs and by exclusion of other causes of vestibular dysfunction (Platt and Olby, 2004). The diagnosis of this disease has not received proper attention in India. This clinical article presents the diagnosis and successful management of geriatric vestibular disease in a Pomeranian dog.

A 14 years old Pomeranian dog was brought to the Teaching Small Animal Clinic of the University with a complaint of sudden onset of head tilt, inappetance, nausea and hind quarter weakness. Treatment suggested by local vet was unsuccessful.

Detailed clinical examination revealed normal body temperature (101.4$^{o}$ F), normal heart rate (110 bpm), respiration rate (22/min.); head tilt towards left side and moving in tight circles towards left side; nystagamus in left eye; incordination and ataxia. Proprioception reaction was normal and no other neurological abnormalities were detected and all other cranial nerves were normal. A careful examination of ear canal did not reveal any discharge and no pain was observed on palpation of temporo-mandibular joint and osseous bullae.

Blood sample was collected aseptically from the cephalic vein in a vial containing $Na_2$-EDTA at 2 mg/ml for haematological and blood smear examination for haemoprotozoa. Haemogram depicted haemoglobin-11.4gm%, total leucocyte count-10.5x$10^3$/µL, differential leucocyte count:-neutrophils-94%, lymphocyte-6%, monocytes-0%, eosinophil-0%, basophil-0%) and adequate platelets. Blood smear examination for haemoprotozoa was negative. A heparinised sample was also obtained for serum biochemistry. Serum biochemistry values included a total protein 5.5gm%, albumin 2.7gm%, alanine aminotransferase 100 U/L, alkaline phosphatase 99 U/L, total bilirubin 0.2 mg/dl, blood urea nitrogen 24 mg/dl, creatinine 1.0 mg/dl and glucose 80 mg/dl. Faecal examination was negative for ova and cyst of endoparasites. Radiograph of skull revealed normal radiographic density of osseous bullae and temporo-mandibular joint and absence of abnormal fluid density and/or soft tissue density in tympanic bullae eliminated the possibility of otitis and neoplasia, respectively.

Based on the history i.e. age of the dog and acute onset of symptoms, clinico-haemato-biochemical examination, negative coprological examination and normal radiograph of skull, present case was diagnosed as of geriatric canine vestibular disease.

The dog was treated with dopamine receptor blocker i.e. prochlorperazine* (Tab Stemetil, NPIL) @ 5mg/kg PO, BID; a combination of cinnarazine and domeperidone** (Tab Domstal CZ, Torrent) @1/2 tab PO, BID; ranitidine*** (Tab Aciloc, Cadila Pharma) @ 2mg/kg PO, BID and tablet Neurobion Forte**** (Vit. $B_1$, $B_6$ and $B_{12,}$ Merck) 1 tab PO, BID for one

[*]Department of Teaching Veterinary Clinical Services

[*] Stemetil, M/s Nicholas Piramal India Limited, Mumbai- 25mg/tab., **Domstal CZ, M/s Torrent Pharmaceuticals Limited Ahmedabad- Cinnarazine 20mg and Domeperidone 15mg/tab.
*** Aciloc, M/s Cadila Pharma, Ahmedabad- 150mg/tab.
**** Neurobion Forte, M/s Merck Limited Mumbai- Vit. B1 10mg, Vit. B2 10mg, Vit B6 3mg and B12 15 mcg, Nicotinamide 45 mg and Ca-Pantothenate-50 mg.

week. The dog was fully recovered within a week.

Peripheral vestibular disease is much more common in dogs than central vestibular disease and generally carries a better prognosis. Peripheral vestibular disease occurs as a result of congenital problem, infection, neoplasia, polyps, or trauma affecting the vestibular nerve in the middle and inner ear; from aminoglycoside induced receptor degeneration; or from a transient idiopathic syndrome in the geriatric dogs (Chrisman 1991; Nelson and Couto, 1998). In present case, the old age and per-acute onset of unilateral peripheral vestibular disease with no other neurological abnormalities have given the first clue in the diagnosis of canine geriatric vestibular disease. There is no known cause for geriatric vestibular syndrome. The diagnosis of this disease is based on the exclusion of other causes of peripheral vestibular dysfunction and on the alleviation of clinical signs with time (Nelson and Couto, 1998; Platt and Olby, 2004).

Left sided head tilt, tight circling towards left side, nystagamus in left eye, incoordination and ataxia supported the finding as reported by Varshney *et al.* (2008). Absence of cranial nerve deficits, proprioceptive abnormalities and head tremor or hypermetria suggested no involvement of central vestibular diseases in this case and further supported the diagnosis of geriatric canine vestibular disease. Normal skull radiographic findings have excluded the involvement of chronic infection, trauma, polyps or neoplasia and inflammation. Cinnarizine acts as a labyrinthine sedative and also improves the microcirculation in the labyrinth. Prochlorperazine acts as dopamine receptor antagonist and is used for control of nausea, vomiting and vertigo. Alleviation of clinical signs with vestibulo-sedative drugs further supported the diagnosis of geriatric canine vestibular disease in present case.

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# Trypanosomiasis in dog: A Case Report

*K. Sarma[1], M. Saravanan[1], M. Kumar[2], A.A. Dar[1], A. Kumar[1], R.K. Jadhav[1] and D.B. Mondal[3]*
Division of Medicine
Indian Veterinary Research Institute, Izatnagar-243122, Bareilly, U.P.

**Abstract**

A 5yrs male Labrador dog was presented with the history of unilateral blindness, corneal opacity with anorexia, dullness and persistant fever. Blood smears examination revealed presence of *Trypanosoma evansi*. Haematological evaluation revealed decrease haematological biochemical value. Case was treated successfully with diminazene diaceturate and supportive therapy.

**Keywords:** : Dog, T*rypanosoma evansi*, corneal opacity, haemato-biochemical changes, treatment

Trypanosomiasis caused by *Trypanosoma evansi* in dog is characterized by intermittent fever, dullness, emaciation, anemia, conjunctivitis, corneal opacity, sexual excitement, staggering gait (Arora and Pathak, 1995; Varshney *et al.*, 1998), oedema of throat with changed voice and difficulty in swallowing, posterior ataxia and impaired hearing (Varshney *et at.*, 1998a) and myocarditis. Bilateral corneal opacity and other ocular lesions are well documented in clinical and experimental canine trypanosomosis (Balakrishnan *et al.*, 1994).Diagnosis by blood smears examination in majority of cases except in few cases where organisms were demonstrated in aqueous fluid (Varshney *et al.*, 2005*).*

A 5years male Labrador dog was presented at Referral Veterinary polyclinic, IVRI, Bareilly, Izatnagar, UP with the history of unilateral blindness, corneal opacity since last 4-5 days (Fig.1) with anorexia, dullness and persistent fever for three days. Clinical examination revealed high rise of rectal temperature (104$^{o}$F), increased pulse rate (98/minute) and respiration rate (28/minute), pale mucous membrane, bilateral lacrimation, corneal opacity and generalized debility. Detailed ocular examination of the present case revealed unilateral photophobia, epiphora, conjunctivitis, perisclerał congestion, lacrimation, keratitis, haziness and unilateral (left eye) corneal opacity. Present observations were in agreement with the findings of Rani and Suresh (2007) who reported *T. evensi* organism in peripheral blood with history of in appetence, dullness and persistent fever since five days along with Examination of bilateral corneal opacity which is a characteristic finding in chronic trypanosomosis (Thirunavukkarasu *et al.*, 2004). Examination of giemsa stain blood smear (Coles, 1986) revealed *Trypanosoma evansi* parasites (15 per field) (Fig. 2) and Microcytic hypochromic RBCs.

Haematological examination revealed decreased Hb (8.4g/dl), RBC (4.12 million/cmm), PCV (26%) and TLC (3200/cmm). Serum biochemistry revealed decreased level of BUN (13.80mg/dl), Creatinine (2.67 mg/dl), ALT (4.43IU/dl), Total protein (0.63g/dl), albumin (0.18g/dl) and glucose (30.67mg/dl) in blood. The ailing dog was subjected to Diminazene diaceturate @ 3.5mg/kg body weight IM, 5% DNS IV along with vitamin E IM and liver tonic (Pepsid®) IM for 5 days. The anemic changes are attributable to extravascular destruction of RBC which may be through the process of erythro phagocytosis or metabolic product

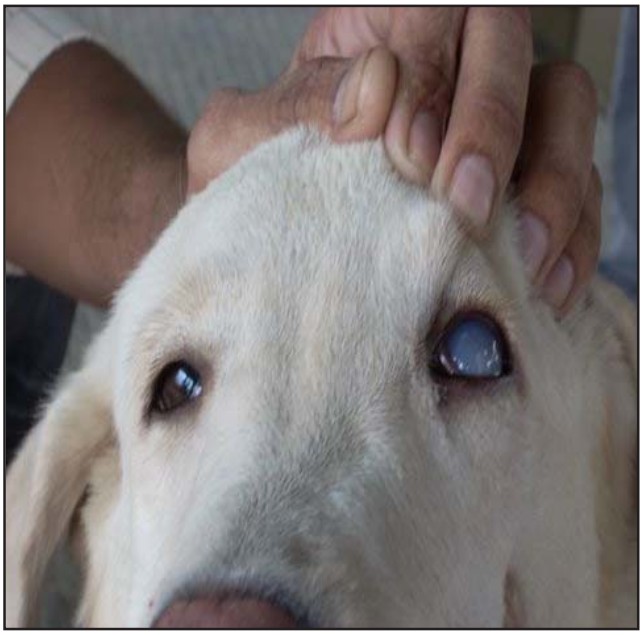

**Fig.1** Dog showing prominent corneal opacity (left eye)

Present Address
[1]PhD scholars, Division of Medicine, IVRI, Izatnagar, Bareilly, UP, [2]Researches Associated, IVRI, Izatnagar, Bareilly, UP
[3]Seneior Scientist, Division of Medicine, IVRI, Izatnagar, Bareilly, UP

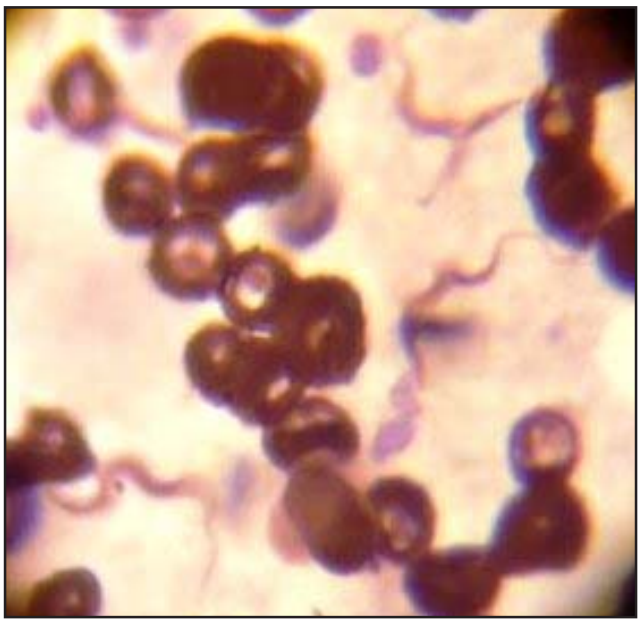

**Fig.2**. Giemsa stained blood smear of dog showing *T.evensi* (100X)

and toxins liberated from the parasites. The metabolic products and toxin liberated may be the reason for low blood glucose depleting glycogen reserve due to hepatic changes. Present therapy was found effective as blood smear examination showed no trypanosome after 7 days of therapy and clearance of unilateral corneal opacity in the left eye within 10 days of therapy also reconfirmed the effectivity of therapy.

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# Idiopathic thrombocytopenia in a English Springer Spaniel

*Usha N. Pillai, Elso John and P.V. Tresamol*
Department of Clinical Veterinary Medicine,
College of Veterinary & Animal Sciences, Mannuthy, Thrissur - 680 651

## Abstract

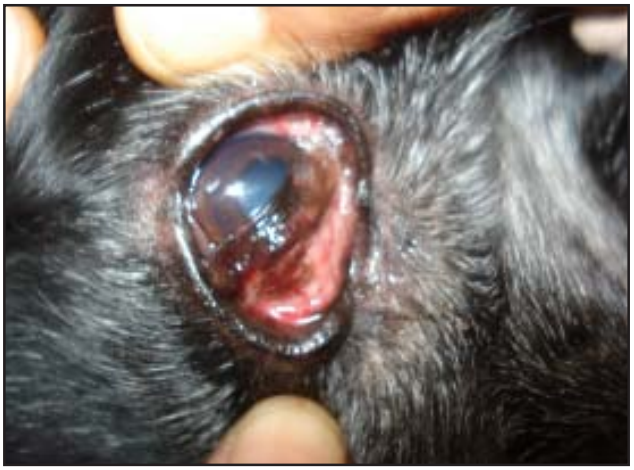
Canine idiopathic thrombocytopenia (ITP) is a serious and relatively common haematologic disorder in Veterinary medicine in which platelet bound antibodies initiate premature destruction by cells of mononuclear phagocytic system. Corticosteroids are advocated for initial therapy of ITP because of their ability to prevent destruction of antibody-coated platelets by reticuloendothelial system. The present paper deals with a case of idiopathic thrombocytopenia in a English Springer Spaniel.

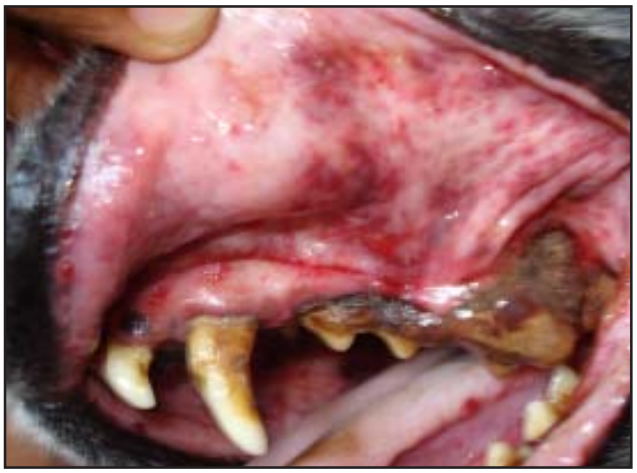
**Keywords:**

A nine year old male English Springer Spaniel weighing 20 kg was referred to College Veterinary Hospital with three day history of bleeding from mouth, nostril and haematuria. The dog did not have any exposure to drugs or toxins and had no travel history. The dog was vaccinated about 10 M back with multicomponent vaccine.

On physical examination, numerous petechiae on the oral and penile mucosa and large ecchymotic lesions on the ventral abdomen were noted (Fig.1and 2). Routine staining of blood smear using Leishman's and acridine orange were negative for *E. canis* and *Anaplasma phagocytophilum*. Results of abdominal sonography and thoracic radiography were normal. Haematologic abnormalities included severe thrombocytopenia (L 5000/ µl) and slight normocytic normochromic anaemia. The total and differential leukocyte counts were within normal range. An evaluation of RBC morphology revealed no spherocytosis or autoagglutination which helped to rule out the possibility of immune mediated haemolytic anaemia. Serum biochemical abnormalities included hyperprotenemia with hypoalbunaemia (2.2 g%) and hyper globulinaemia (5.4 g%). Blood urea nitrogen (BUN), creatinine, and ALT were within normal range. Electrophoretic studies on serum protein showed hypoalbunaemia and elevated â and ã globulin with absence of monoclonal band which help to rule out multiple myeloma, one of the possible cause for thrombocytopenia. A presumptive diagnosis of ITP was made and immunosuppressive dose of glucocorticoid therapy was started with other supportive therapy. The platelet count was increased on 3$^{rd}$ day of treatment. Inspite of the therapy with fluids, antibiotics corticosteroids and other supportive therapy, the animal died on 5$^{th}$ day of hospitalisation. The owner was unwilling to do the post mortem examination.

Idiopathic thrombocytopenia (ITP) is a disease in which antibodies bound to the surface of platelet cause premature destruction by macrophages (Putsche and Kohn, 2008) which may be primary or secondary. Immune mediated thrombocytopenia in the absence of other identifiable disease is referred to as primary or idiopathic. The breeds most frequently mentioned are cocker spaniels, golden retrievers (Wilkins *et al.*, 1973). Surface bleeding as observed in the present case was the most commonly described bleeding type in dogs





with ITP and this might be due to thrombocytopenia and platelet dysfunction. Presumptive diagnosis primary ITP is made on the basis of exclusion of other identifiable causes of thrombocytopenia (Scott *et al.*, 2002) and immunosuppressive therapy with glucocorticoids was started but complications from haemorrhage may resulted in fatality of the present case (Bianeo *et al.*, 2007).

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# Chronic ehrlichiosis in dog

*M.K. Srivastava and Ashish Srivastava*
Department of Medicine,
Pt. Dean Dayal Upadhayay Pashu Chikitsa Vigyan Vishwavidyalaya Evam Go anusandhan Sansthan,
Mathura-281001, U.P.

## Abstract

A 2 year old intact male Labrador dog weighing about 25 kg referred with the complaint of anorexia, persistent vomiting, lethargy, malena and circling since one week and two episodes of haematemesis in last two days. The complete blood count (CBC) revealed a marked thrombocytopenia, moderate anemia and leucopenia. The coagulation time was nine minutes. Blood smear examination revealed presence of the Ehrlichia moroulae, as intracytoplasmic inclusion bodies within the white blood cells. Doxycycline was used for the treatment of ehrlichiosis, supportive therapy of prednisolone and vincristine for thrombocytopenia, oral adrenor therapy for haemetemesis along with fluid, liver extract, iron preparation etc. There was gradual improvement in clinical condition, but the dog finally succumbed after 21 days of treatment.

**Keywords:** Dog, Doxycycline, Ehrlichiosis, Prednisolone, Thrombocytopenia.

The present case report describes a case of ehrlichiosis in dogs. A 2 yr old, intact male Labrador dog weighing about 25 kg was referred to Department of Medicine, DUVASU, Mathura with complaint of anorexia, persistent vomiting, lethargy, malena, circling since one week and two episodes of haemetemesis in last two days. Anamnesis provides information regarding treatment of ehrlichiosis with doxycycline two month ago. Initial physical examination revealed high temperature ($105^0$C), moderate dehydration (++), emaciation, weight loss, elevated pulse and respiratory rates, pale mucous membrane, a painful abdomen on palpation.

Blood sample was taken prior to administering fluid and analyzed for complete blood (cell) count (CBC) and serum biochemical profile (table-1). The CBC revealed a marked thrombocytopenia, moderate anemia and leucopenia. The coagulation time recorded was nine minutes. Urinalysis of voided urine was unremarkable. Blood smear examination revealed the presence of the *ehrlichia* morulae, as intracytoplasmic inclusion bodies within white blood cell. Ultrasonography confirmed hepato-splenomegaly. Survey lateral and ventrodorsal radiographs of the abdomen were unremarkable except hepatomegaly.

Based on the clinical examination and packed cell volume, fluid therapy was started with lactated Ringer's and Dextrose Normal Saline to correct deficit and normal and abnormal fluid losses. For the later course of the disease, the dog was kept on maintenance dose of fluid therapy based on body weight. Doxycycline was used for treatment of ehrlichiosis @ 25mg/kg b wt, PO (Egenvall *et al.,* 1997) along with analgin till fever persisted. For treating malena, vitamin K, sucralfate and omeprazole were administered. Vomiting was controlled by using ondanstaron and metachlorpramide. For thrombocytopenia prednisone was administered @ 2 mg/kg b wt weight with tapering

| Lab Parameter | Day 1 | Day-5 | Day-12 | Day-19 |
|---|---|---|---|---|
| TLC (cells/cu m.m) | 5800 | 5500 | 5300 | 5700 |
| DLC (%) | N-87L-13 | N-71L-28E-1 | N-64L-32E-4 | N-60L-37E-3 |
| Hb (gm%) | 10 | 8.4 | 7.4 | 6.8 |
| Platelet count (lacs) | 1.38 | 1.45 | 1.68 | 2.18 |
| Blood urea (mg/dl) | 23.5 | 26.2 | 29.8 | 32.6 |
| Serum creatinine (mg/dl) | 0.8 | 0.9 | 0.7 | 0.8 |
| Serum bilirubin (mg/dl) | 0.6 | 0.7 | 0.6 | 0.8 |
| SGOT(Units/L) | 50.2 | 40.8 | 52.8 | 44.2 |
| SGPT(Units/L) | 25.3 | 30.6 | 32.4 | 38.8 |
| ALP (IU/L) | 76.9 | 86.8 | 78.8 | 74.4 |
| Total protein (gm/dl) | 7.8 | 7.5 | 7.9 | 7.6 |
| Globulin | 4.7 | 4.5 | 5.1 | 5.4 |
| Albumin | 3.1 | 3.0 | 2.8 | 2.2 |

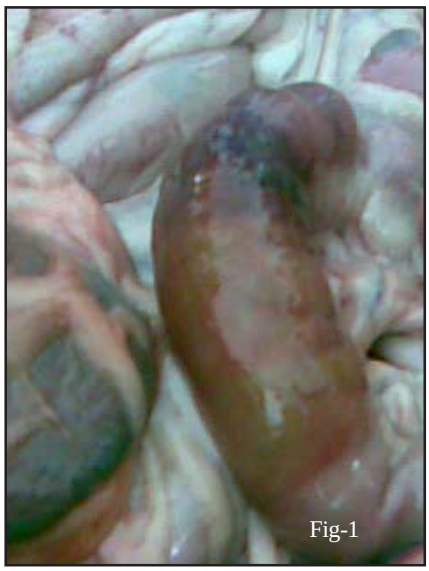
Fig-1

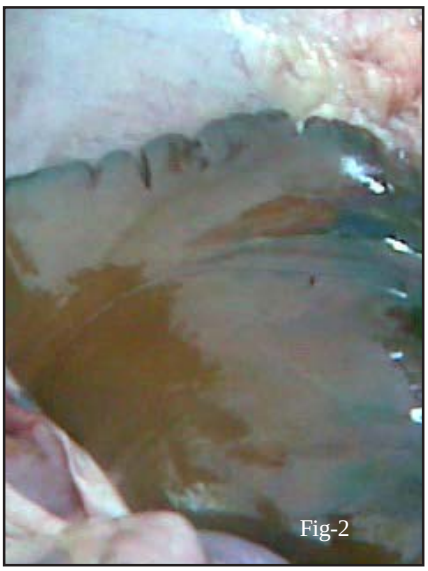
Fig-2

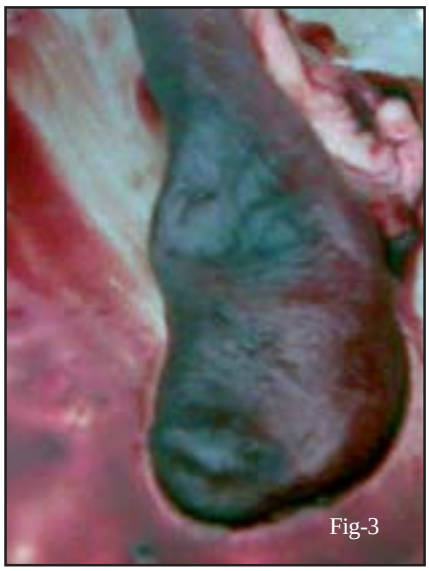
Fig-3

**FIg. 1, 2, 3: showing haemorrhage in intestine, hepatomegaly, splenomegaly**

schedule. Supportive therapy with vitamins and liver extract was given throughout the course of the disease. For controlling haemetemesis, oral adrenor therapy was done. Suddenly on day 21th owner informed that the dog was crying with severe abdominal pain. Immediately dog was given inj. Dicyclomin plus acetaminophen and Pentazocin lactate at interval of 3 hour but pain did not subside and the dog expired. All the drugs used for present case were as per standard dosages, route and schedule.

Post mortem examination revealed severe ulceration and widespread hemorrhage throughout the intestine (fig-1). Liver was highly enlarged with focal discoloration; the margin of liver was fissured with petichae throughout the liver (fig-2). Spleen was also enlarged with petichae and a small fibrous mass at the tip (fig-3).

Hepatomegaly and pain on abdominal palpation might have been due to multiplication of organism within circulating mononuclear cells and mononuclear phagocytic tissues of liver, spleen and lymph node (Hildebrandt *et al.*, 1973). Treatment with prednisolone increases platelet counts (Neer, 2002) initially and came near to normal after vincristine therapy (table-1) and malena subsides after 5th day of therapy. Reason for thrombocytopenia may be consumption, sequestration and destruction of platelets (Harrus *et al.*, 1998). Even after haemetenics therapy, anaemia persists during whole course of disease, suggested reasons are bleeding in form of malena and hypoplasia of bone marrow precursor cells in the chronic phase of ehrlichiosis (Neer *et al.*, 1998). Hypergamma-globulinemia and hyperprotienemia along with hypoalbuminemia is possibly due to development of a secondary autoimmune response to damaged host cell components. Other biochemical abnormalities like high SGOT, SGPT, ALP, BUN and creatinine were parallel with Egenvall *et al.*, (1997).

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# Treatment of hyperthermia in buffaloe and a Sahiwal cow- A Case Report

*S.S. Randhawa, Sushma Chhabra and P.S. Dhaliwal*
Department of Clinical Veterinary Medicine E & J, College of Veterinary Science,
GADVASU, Ludhiana-141 004, Punjab.

**Abstract**

Hyperthermia is a common disease of dairy animals in Punjab associated with high environmental temperature and humidity. Treatment with daily subcutaneous dose of iodized oil @ 750 mg/ animal for three days was effective in treating hyperthermia.

**Keywords:** Buffaloes, hyperthermia, iodized oil.

Hyperthermia, one of the common diseases of dairy animals in Punjab, is manifested by high body temperature and is associated with high environmental temperature and humidity. The condition is mostly encountered during July to September. However, sporadic cases have also been reported in May and June also. After a successful trial of parenteral iodine in hyperthermic cross-breed cows (C*hhabra et. al*., 2008), it was tried in hyperthermic buffaloes and an indigenous cow in the present study.

Five buffaloes and one Sahiwal cow were presented at clinic of the college in June, July and September. The body temperature used to be normal in the early morning but increased as the day progressed with the peak (104.6$^{o}$F to 108$^{o}$ F) in the evening hours. Panting, salivation, reduced feed intake, decreased milk yield were other associated signs. One animal had history of FMD and other ones were recently purchased. Blood examination revealed mild relative neutrophilia (TLC=6.94 ± 1.21 x10$^{3}$/îl, N= 46.25 ± 2.41 %), normal haemoglobin (11.5± 1.02 g/dl) and negative blood smears for haemotropozoa. Initial treatment with broad spectrum antibiotics and antipyretics by local veterinarians was futile.

Hyperthermia with panting is common sequelae of FMD in dairy cows (Radostits et al, 2000). All the hyperthermic animals were injected 5 ml of iodized oil (containing 750 mg of elemental iodine-Inj I fer H; Carevet Pharma, Ludhiana) subcutaneously in the brisket region for 3 days and kept under observation for 1 month.

Sahiwal cow having concurrent lactic acidosis was also given 80 g sodium bicarbonate orally for 2 days along with oral ruminotorics (Antimony potassium tartarate), parenteral liver tonics for 6 days and rumen cud.

All the animals responded well by day 3 with returning of body temperature within the normal range. No relapse was recorded 1 month post-therapy. Feed intake improved by day 4 and milk yield restored back in 4 to 10 days. The response of the animals could be due to increased levels of thyroxine in response to iodine administration (Chhabra et al, 2008). Thyroxine in turn had a negative feedback effect on secretion of TSH and to some extent on the TRF from hypothalamus (Kaneko, 1989) and hence the thyroid hormones that were required to increase BMR of the body.

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# Tetanus in a German Shepherd dog- A Case Report

*Amiya K. Rautray, K.K. Sardar[1], Srinibas. Das[2] and R.C. Patra*
Department of Medicine,
Faculty of Veterinary Sciences & A.H., Orissa University of Agriculture and Technology (OUAT),
Bhubaneswar-751003, Odisha.

**Abstract**

A German Shepherd dog 1 yr old weighing 6 kg was presented with the complaints of lockjaw, stiffness and rigidity of the limbs, caudal retraction of lips with risus sardonicus, lateral recumbency and dyspnoea. The dog was treated with Tetanus antitoxin (Tetglob) @250 I.U. intrathecally ;. Diazepam @ 0.5 mg/kg b.wt. i.v.; procaine penicillin G @ 22000 I.U. /kg b.wt i.m. The clinical symptoms returned to normal and the dog showed standard locomotion.

**Keywords:** Tetanus, Dog, Antitoxin

Tetanus is a clinical disease caused due to localization and proliferation of *Clostridium tetani* in body tissues under anaerobic environment by liberation of exotoxin and is common in warmer parts of the world (Chakrabarty, 2004). The disease is rare in dogs and is characterized by mucular rigidity, convulsion, hyperaesthesia and sometimes respiratory arrest (Ettinger and Feldman, 1995; Radostits *et al.*, 2000) and the disease occurs individually or sporadically (Smith, 2002). The spore-forming organism enters the body through the wound that gets contaminated by soil containing the organism or its spore (Vijay Kumar *et.al.* 2003). The present communication reports a case of tetanus in a German Shepherd male dog and its treatment.

A 1yr old German Shepherd male dog weighing 6 kg was presented to the Teaching Veterinary Clinical Complex, Orissa University of Agriculture and Technology, Bhubaneswar with the complaints of lockjaw, stiffness and rigidity of the limbs, caudal retraction of lips with *risus sardonicus*, lateral recumbency and dyspnoea. The rectal temperature was 104.2°F which is attributed to heat generation due mainly to severe muscle spasm. The respiration rate was found to be 32/minute; heart rate was 78/minute along with tachycardia. The hematological examination revealed Hb 12.5gm %, total leukocyte count 12500/ cubic mm; differential leucocyte count with neutrophil 69 %, eosinophil 2 %, basophil 0 %, lymphocyte 25 %, monocyte 4 %. The dog had a history of open of radio-ulnar fracture 15 days back followed by development of pus. Examination of pus revealed *Clostridium tetani*. The animal showed hyperaesthesia following approach. The wound dressing was done regularly, but prophylaxis against tetanus was not done. The diagnosis for this disease is essentially clinical and usually not difficult, based on the medical history and symptoms presented by the animal (Sedrish *et. al.*, 1996). Based on the above clinical signs, the present case was tentatively diagnosed as tetanus.

The dog was administered with Tetanus antitoxin (Tetglob) @250 *I.U.* intrathecally in between the sacrococcygeal junction @ 0.5 ml for 4 days. Diazepam was administered @ 0.5 mg/kg b. wt. i.v. for 4 days to prevent the stiffness of the whole body. The dog was administered with procaine penicillin G @ 22000 I.U. /kg b. wt. i.m. and also in and around the wound. Dog was kept in a dark noise free room and its external ear canal was plugged with cotton as reported by Bhadwal *et al* (2005). Dextrose normal saline was given @10 ml/kg b. wt. i.v. In addition to penicillin, the apparently positive outcome can also be obtained with the use of oxytetracycline (LA) i.v. suggesting that this antibiotic is effective and economically feasible for dogs (Coleman, 1998).

*Clostridium tetani* is ubiquitous and persists in soil in spore form and enter the body through open wound (Johnston, 1994). The dog showed typical signs of tetanus and was mainly diagnosed by its characteristic manifestation (Greene *et al.* 1990). The dog was kept in dark noise-free room as mild stimulation

[1]Pharmacology and Toxicology, [2]Director of Clinics

Tetglob: Bharat Serum and Vaccine Limited, Mumbai
Diazepam (Dizep) – Intas Pharmaceutical, Ahemedabad
Penicillin G, Alembic Pharmaceuticals -ALEMBIC ROAD Baroda, Gujarat, India - 390003

or any kind of disturbance precipitated periodic generalized tonic contraction of all the muscles resulting in *grand mal* convulsion. Following treatment for 4 days, the clinical symptoms manifested by the animal gradually subsided but mild stiffness of the limbs continued for more than 25 days and finally switched over to standard locomotion after one month. The current finding was in agreement with Bhardwaj (2009) who reported that it took 1-2 months for complete recovery of a kid.

The importance of prophylaxis by means of early and proper nursing of wounds (particularly on the extremities), and timely administration of tetanus antitoxin along with vaccination with two initial doses of tetanus toxoid, administered at an interval of 3 to 4 weeks, followed by periodic revaccination every 1 to 5 years can provide excellent immunity. Prophylaxis may also be recommended in pregnant bitches considering the importance of passive immunity to pups through colostrum.

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# Gastric Dilatation - Volvulus in a dog

*Usha Narayana Pillai and Premni Elias*
Department of Clinical Veterinary Medicine, College of Veterinary & Animal Sciences
Mannuthy, Thrissur - 680 651, ushanpillai@yahoo.com

## Abstract

Gastric dilatation - volvulus (GDV), medical and surgical emergency is most commonly seen in large and giant breed dog and occasionally in cats. The syndrome is characterized by accumulation of gas in the stomach and malpositioning stomach with obstruction of eructation and pyloric outflow which may lead to hypovolemia, endotoxic shock, respiratory compromise, concurrent acidosis and alkalosis and reperfusion injury.

**Keywords:** Gastric dilatation-volvulus, dog.

A German shepherd dog 3 yr old was brought to the Veterinary College Hospital with the history of acute distension of abdomen about 2 days back. On clinical examination, animal had mild tympanic abdomen, retching, unproductive vomiting and hypersalivation. The animal was tachypnoeic with rapid, weak and thready pulse. ECG showed severe ventricular tachycardia. Endoscopic examination revealed slight megaoesophagus with peeling of gastric mucosa. Based on history, clinical signs and physical examination, a tentative diagnosis of GDV was made. Immediately the animal is administered balanced electrolyte solution @ 10 ml/kg/first hr, steroids and antibiotics, metoclopromide (0.3 mg/kg) and injectable antacid ( Rantidine @ 2 mg/kg I/M ). After fluid resuscitation radiographs are made to determine position of stomach. Right lateral radiograph revealed pylorus in craniodorsal abdomen as gas filled structure or stomach appeared as 2 compartments divided by a soft tissues of lesser curvature of stomach and duodenum as they course caudally from the abnormally positioned pylorus (Fig.1). The findings confirmed the case as gastric dilatation and volvulus. Since the owner is unwilling for surgical operation, the case was discharged from hospital.

GDV is considered as a disease requiring emergency management. Resolution of hypovolemia is the primary concern followed by decompression, surgical correction of volvulus and adequate postoperative care (Broom and Wash, 2003). Bright ( 2004 ) also observed similar clinical signs in GDV affected dogs.Though diagnosis of GDV in dog is most often made on the basis of signalment and clinical signs x- ray give valuable information pertaining to the position of stomach. Megaoesophagus observed in the present case might be due to aerophagia as a part of pathogenesis of GDV.

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# Duodenal foreign body in dogs: Endoscopic findings*

*M. Saravanan[1], B. Nagarajan[2] and S. Kavitha[3]*
Department of Veterinary Clinical Medicine Ethics and Jurisprudence,
Madras Veterinary College, Chennai- 600 007.

**Abstract**

A 1yr old female spitz dog showed dull, pale mueous membrane and abdominal pain. Endoscopic examination revealed small piece of bones in duodenum and sucessfully retrived by endoscopic grasping forceps.

**Keywords:** Duodenal foreign body, dog, endoscope.

Richter (1992) recorded a variety of foreign bodies like fruit pits, rubber ball, chew toys, marbles and bones in the duodenum of dog. The clinical signs associated with intestinal foreign bodies were variable and includes severe vomiting, diarrhoea and abdominal pain (Leib and Matz, 1997).

A one year old female Spitz dog weighing 6 Kg and a 1.5 years old non- descriptive male dog weighing 15 Kg were brought to Small Animal Medicine Unit of Madras Veterinary College Teaching Hospital, Chennai with the history of chronic vomiting, deprived appetite and weight loss for last one week. Physical examination revealed dull, pale mucous membrane and abdominal pain. Faecal sample examination revealed negative for parasitic infection. Haematological and biochemical values were found within the reference values. Radiological examination of abdomen revealed no radio opaque material. So endoscopy examination was performed for the above said cases.

Preparation and restraining of the patient was done as suggested by Zoran (2001). Endoscopic examination was performed (Tams, 1999) with video endoscope (Karl Storz types no 60914 PKS). Video endoscopic examination revealed small pieces of bones in proximal portion of duodenum(Spitz) are shown in the figure1 and thread pieces in mid portion of the duodenum (Non- descriptive dog) shown in the figure 2. Thread piece was retrieved by endoscopic grasping forceps. Bone pieces could not be removed as they were very small in size. Foreign bodies can be successfully retrieved by endoscope from the upper small intestine except sharp objects. Foreign bodies like string or thread in intestinal tract could be attempted to grasps gently by grasping forceps and retracted through stomach, oesophagus to oral cavity. Duodenal foreign bodies are more difficult to remove than gastric or oesophageal foreign bodies because foreign bodies retained in this area often become wedged and there is

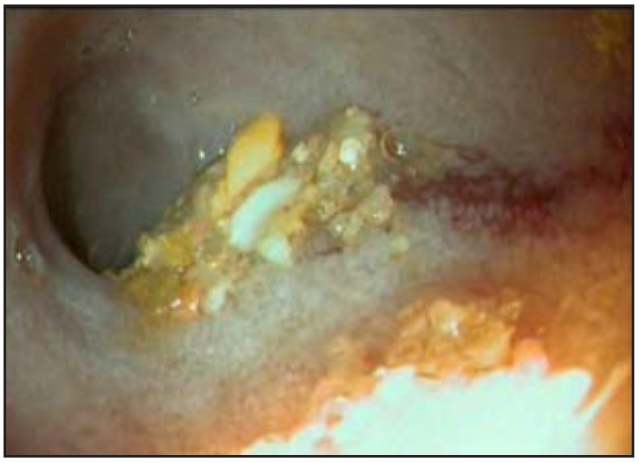

**Fig. 1.** Bones in proximal portion of duodenum

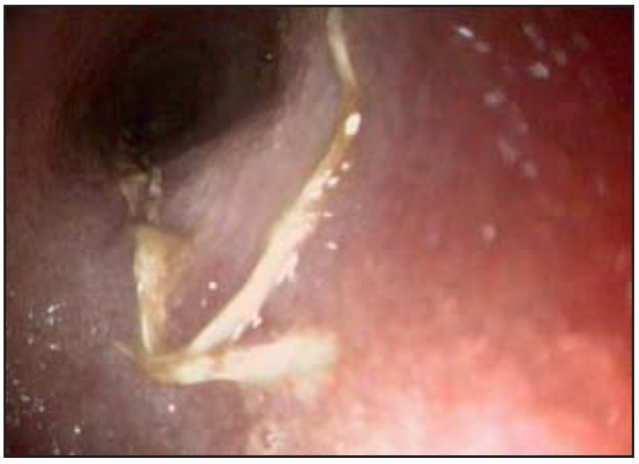

**Fig.2.** Thread pieces in mid portion of the duodenum

*Part of M.V.Sc thesis of the first author, [1]Ph.D scholar, Division of Medicine, Indian Veterinary Research Institute, Izatnagar, Bareilly-243 122 (UP), India. Email: sara82vet@yahoo.com.
[2]Professor, Department of Veterinary Clinical Medicine Ethics and Jurisprudence., [3]Associate Professor, Department of Veterinary Clinical Medicine Ethics and Jurisprudence, Madras Veterinary College, Chennai- 600 007.

limited space for manoeuvring (Tams, 1999). If resistance is encountered during retraction of object, further traction should not be applied otherwise perforation may occur in the intestine (Hedlund, 2002).

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# Gangrenous mastitis in a bitch- A case report

*A. Kumar, S.K. Singh, S. Dey[1] and D. Swarup*
Division of Medicine, Indian Veterinary Research Institute, Izatnagar-243122, Bareilly, U.P.

**Abstract**

A 4.5-year-old Spitz bitch was presented with history of whelping 10 days before, swollen mammary gland, anorexia and dullness. Upon physical examination swollen mammary gland with purulent milk, red- purple necrotic patches with abscess formation were noted. Clinical parameters were within physiological limit while hematological examination revealed leukocytosis. Based on clinical observation and white side test gangrenous mastitis was suspected. Cultural examination confirmed Staphylococcus as causative agent. Treatment was instituted based on Antimicrobial sensitivity test which showed maximal sensitivity to oxy-tetracycline. The animal recovered uneventfully with the therapy adopted.

**Keywords:** Bitch, mammary gland, mastitis, oxy-tetracycline, *staphylococcus*;

Mastitis in bitches is a welfare and ethical concern unlike dairy animals where it is associated with production. It induces pain, swelling and suffering in the affected bitch. All previous investigators agree that the disease is of importance for the post-parturient bitch (Olson and Olson, 1984). Generally, it is caused by bacterial infections and often associated with poor sanitary condition, trauma to the gland and systemic infections (Kahn, 2005). The disease occurs primarily during the postpartum period and more frequently, from 6th to 10$^{th}$ day after whelping (Olson and Olson, 1984; Biddle and Macintire, 2000). It can also occur during pseudo-pregnancy, as well as after early weaning of puppies. Usually mammary infection is ascending, with haematogenous spread from other infection sites (uterus) also possible. Various bacteria have been incriminated as etiological agents of the disease (*Staphylococcus* spp., *Streptococcus* spp., *Escherichia coli*); however, no microorganisms could be isolated from some of the cases of clinical mastitis (Von and Henschelchen, 1983). The condition is more serious when the immunity of the animal is compromised due to hormonal changes, stress and metabolic imbalances during pregnancy and lactation. Many a times due to drug resistance, the treatments remain ineffective and the infection leads to gangrenous mastitis. Mastitis in domesticated milch animals is well documented in India but clinical cases in bitches have not been reported with the same frequency. The present report records diagnosis and management of gangrenous mastitis in a bitch.

[1]Corresponding author
e-mail: Sahadeb_dey@hotmail.com
Tel: +91-0581-2300587; Fax: +91-0581-2303287

A 4.5-years-old Spitz bitch weighing about 12 kg was presented to Referral Veterinary Polyclinic with a history of whelping 10-days before, death of all pups within 5-days after whelping, swollen mammary gland, anorexia and dullness for last 5 days. The clinical examination of animal demonstrated rectal temperature (103.4$^0$F), congested conjunctival mucous membrane, and swollen mammary glands with purulent milk. Red-purple necrotic patches with abscess formation were observed on the affected mammary glands (Fig. I). Animal was mildly dehydrated, dull and revealed pain on palpation of affected mammary glands. Pulse rate (71/min) and respiration rate (23/min) were within physiological limits. Blood sample was collected into EDTA-containing vial and complete haematological examinations were carried out by routine methods of examination. Haematological examination revealed increased total leukocytes (19,650 cells/ìl) and neutrophils (82%). Other haematological parameters were unremarkable.

Based on clinical observation and Whiteside test (WST) as described by Schalm *et al.* (1974) the clinical case was tentatively diagnosed as gangrenous mastitis. Further, for isolation of causative agent, milk sample was collected aseptically and cultured on blood agar. Typical hemolytic colony observed on blood agar. *Staphylococcus* spp was suspected based on colony character and â-hemolytic activities. The organisms isolated were subjected for smear preparation on a glass slide and subsequently stained using grams stain. Microscopic examination under oil immersion microscope (100X) revealed grape-like colonies of grams positive *Staphylococcus* spp. For confirmation, culture was inoculated to Mannitol salt agar (Selective

medium for *Staphylococcus*) which showed typical yellowish colonies of *Staphylococcus* spp. (Fig II).

The treatment was instituted based on antimicrobial sensitivity test (ABST) to prevent further spread of necrosis (Shirley *et al.*, 2001). The ABST pattern had given the maximum sensitivity to Tetracycline in comparison to Gentamicin, Amoxycillin, Ampicillin, Enrofloxacin and nalidixic acid. Therapeutic management comprised, Oxy-tetracycline @ 11 mg/kg bwt, iv for 7 days, fluid therapy (Dextrose normal saline), meloxicam @ 0.3 mg/kg im, bid for 7 days, and Povidone-iodine solution was used for topical application. Daily striping of affected mammary glands was advised for removing the milk. Clinical signs were remarkably regressed within 10-days and the bitch started taking normal food from day 3 of the start of treatment. Altered hematological parameters were also ameliorated towards the normal reference range within 7-days of therapy.

Clinical cases of mastitis in bitches have not been reported from India. In present report, the bitch had temperature ($39.66^0$C) suggesting systemic involvement and development of sepsis. Abnormal mammary secretion and enlarged, painful, hot mammary gland(s) with red-to purple coloured abdominal skin, and systemic signs (e.g. depression, fever) have been described as the salient clinical features of the acute phase *Staphylococcus* spp induced mastitis (Ververidis *et al.*, 2007). Few previous reports demonstrate that no microorganisms could be isolated from some of the cases of clinical mastitis in dogs whereas; we have successfully isolated *Staphylococcus* spp. from this clinical case of mastitis in a bitch. *Staphylococcus* spp are involved in suppurative canine infections by producing an exfoliative toxin (Terauchi *et al.*, 2003) and presence of a leukocidin responsible for tissue necrosis has also been reported (Piemont, 1997).

In order to enhance the efficacy of the therapy removal of milk from the mammary glands was recommended as; milk is a good substrate for bacterial proliferation.The organism has shown maximum sensitivity to tetracycline and progression of necrosis started declining 48 hours after treatment. In India, tetracycline is rarely used in canine (Dutta *et al.*, 2009). Perhaps, this could be the reason of sensitivity of the organism. Initial uses of isotonic dextrose saline have corrected electrolyte imbalance, hypoglycemia and augmented detoxification. The bitch recovered uneventfully with the therapy adopted.

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# GENERAL GUIDELINES FOR CONTRIBUTORS

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b. For books:

Snedecor, G.W. and Cochran, W.G. 1994. *Statistical Methods.* VIII edn. Iowa State University Press, Iowa, USA, pp. 287-192.

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d. For thesis:

Singh, S.K. 1998. Studies on clinico-biochemical changes in Downer cow syndrome. M.V.Sc. thesis, Punjab Agriculture University, Ludhiana, India.

e. For proceedings of symposia/conference:

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| | | | | | |
|---|---|---|---|---|---|
| Body weight | b wt | Litre | l | Calory | cal |
| Meter | m | Centimeter | cm | Microlitre | ìl |
| Counts per minute | cpm | Millligram | mg | Cubic centimeter | $cm^3$ |
| Millilitre | ml | Degree centigrade | $^0C$ | Minute(s) | min |
| Degree Fahrenheit | $^0F$ | Once a day | od | Decilitre | dl |
| Parts per million | ppm | Gram | g | Percent | % |
| Hour(s) | hr | Picogram | pg | Inch | in |
| Revolution per min | rpm | Intramuscular | im | Second(s) | sec |
| Intraperitoneal | ip | Square centimeter | $cm^2$ | Intravenous | iv |
| Subcutaneous | sc | Kilo calories | kcal | Thrice a day | tid |
| Kilogram | Kg | Year(s) | yr | Twice a day | bid |
| Volts | V | | | | |

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