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Research Articles

Occurrence of new Leptospira serovars in vaccinated dogs

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Abstract

Dogs suspected for hepatic and renal diseases were screened for leptospirosis and presumptive diagnosis was made by observing as antibody titre of greater than or equal to 100 in the MAT. Based on the results of MAT, 33 serologically positive dogs were grouped into 4 groups viz., *L. grippotyphosa* (n-16), *L. pomona* (n-7), *L. icterohaemorrhagiae* (n-6) and *L. canicola* (n-4). Group V comprised of 10 apparently healthy dogs for comparison. The maximum incidence of disease in vaccinated dogs was recorded in *L. grippotyphosa* group followed by *L. canicola*, *L. pomona* and *L.icterohaemorrhagiae* groups. Haematological evaluation revealed a profound anaemia, leukocytosis, neutrophilia and lymphopenia. Serum biochemistry revealed elevated BUN, creatinine, ALT, ALP, GGT, total and direct bilirubin while electrolyte changes were hyponatremia, hyperkalemia and hyperphosphatemia. Ultrasonography of liver revealed hyperechoic liver, thickened gallbladder wall and ascites. Nephrosonogram revealed hyperechoic cortex, corticomedullary distinction was not clear or absent, pyelectasia, medullay band and hyperechoic medullary rim sign. On gross and histopathologically liver and kidneys were enlarged with varying degrees of vascular and degenerative changes.

Keywords: Dog, Hepatic and renal disease, *Leptospira sp.*

Leptospirosis is a zoonotic disease, which affects both human and animals. Serovars *canicola* and *icterohaemorrhagiae* have been responsible for most cases of canine leptospirosis (Greene, 1995). However, a gradual change has occurred in prevalent serovars with *pomona, grippotyphosa* and *bratislava* being reported more commonly based on recent serological surveys (Scanziani *et al.,* 1994 and Harkin and Gartrell, 1996). The present study describes the occurrence of new leptospira serovars in vaccinated dogs.

Materials and Methods

The study was undertaken at Madras Veterinary College Teaching Hospital over a period of one year. Serum samples were screened for Leptospira antibodies by performing MAT using a battery of ten live leptospira antigens viz, serovars *australis, autumnalis, ballum, canicola, grippotyphosa, hebdomadis, icterohaemorrhagiae, javanica, pomona and pyrogenes* (OIE, 2010). From the history, immunization particulars were recorded. Thirty three (Vaccinated) dogs with Leptospira positive titre greater than or equal to 100 in microscopic agglutination test (MAT) were used for the study. Based on the serovars, they were grouped into four groups viz., gr – I *L. grippotyphosa (n=16)* gr - II *L. pomona (n=7)* gr - III *L. icterohaemorrhagiae (n=6)* gr - IV *L. canicola (n=4).* Ten apparently healthy dogs from the Tamil Nadu commando school dog squad were taken as control group (gr-V) Haemato- biochemical parameters studied were Haemoglobin (Hb), Packed Cell Volume (PCV), Total Erythrocyte Count (TEC), Total Leukocyte Count (TLC), Differential Leucocytic Count, Blood Urea Nitrogen(BUN), Creatinine, Alanine Amino Transferase (ALT), Alkaline Phosphatase (ALP), Gamma Glutamyl Transferase (GGT), Total Protein, Albumin, Bilirubin, Cholesterol, Glucose, Sodium, Potassium & Inorganic Phosphorus (Schalm *et al.*, 2000) and abdominal ultrasound examinations were carried as per the standard techniques. Post mortem examinations were conducted in 10 dogs that died during course of treatment.

Results and Discussion

The clinical findings recorded were pyrexia, anorexia, vomiting, haematemesis, enteritis, melena, congested mucous membrane, icteric mucous membrane, ascites, polyurea and polydipsia. Maximum incidence of the disease in vaccinated animals was recorded in gr I followed by gr II, III and IV. The incidence of the disease attributed to *serovars canicola* and *icterohaemorrhagiae* have decreased, where as serological evidence of infection with *serovars grippotyphosa, pomona* had increased and was probably due to the widespread use of vaccines containing the *serovar canicola* and *icterohaemorrhagiae* (Birnbaum *et al.*, 1998). These findings suggest that consideration should be given to incorporation of *serovars pomona* and *grippotyphosa*

into canine leptospiral vaccines in an attempt to prevent illness in dogs and zoonotic transmission of leptospirosis to humans.

There was significant difference in haemograms between control and clinical groups (Table 1) and all clinical groups exhibited a profound anaemia. There was no significant difference within the leptospira serogroups. In the present study haemogram revealed reduced mean Hb, PCV and RBC in all groups. Keenan *et al.*, (1978) and Lappin (1997) reported that decreased RBC count, PCV and Hb concentrations characterized by a normocytic, normochromic anaemia associated with signs of haemorrhage and blood loss in leptospirosis. All clinical groups exhibited a profound leukocytosis with a prominent neutrophilia and lymphopenia. This may be due to stimulation of neutrophil adherence and activation which may be involved in inflammatory and coagulatory abnormalities (Greene *et al.*, 1998).

There was significantly elevated mean values of BUN, Creatinine, ALT, ALP, GGT, total bilirubin and direct bilirubin as compared to control group (Table 1), with no significant difference within the leptospira sero groups. These elevated values were indicative of hepatic and renal damage in leptospira groups. Sherding, (2000) reported that Azotemia, increased serum concentration of liver enzymes, increased creatine kinase and electrolyte imbalances reflecting renal and gastrointestinal damages in leptospirosis. Hyperglobulinemia was noticed in the present study as reported by Lappin (1997). Electrolyte changes were hyponatremia, hyperkalemia and hyperphosphatemia.

Table 1: Haemato - biochemical values in Canine Leptospirosis.

Parameters	Group	
	Control	Clinical
Hb (g/dl)	14.95 ± 0.50	8.99± 4.07
PCV (%)	47.80 ± 1.09	29.44 ± 12.11
TEC (Million/ cmm)	7.56 ± 0.18	4.80 ± 1.74
TLC (/ cmm)	7340 ± 275.35	31283 ± 20227.8
Neutrophils (%)	66.20 ± 0.66	84.96 ± 8.96
Lymphocytes (%)	26.60 ± 0.56	11.83 ± 7.58
Monocytes (%)	4.60 ± 0.30	2.16 ± 2.32
Eosinophils (%)	2.89 ± 0.35	1.06 ± 1.84
BUN (mg/dl)	14.24 ± 0.73	162.43 ± 159.65
Creatinine (mg/dl)	0.66 ± 0.05	4.8 ± 5.56
ALT (U/L)	17.78 ± 1.55	123.70 ± 165.31
ALP (U/L)	22.95 ± 2.23	366.30 ± 481.16
GGT (U/L)	3.60 ± 0.54	13.6 ± 11.21
Total bilirubin (mg/dl)	0.25 ±0.03	3 ± 6.42
Direct bilirubin (mg/dl)	0.06 ± 0.08	1.31 ± 3.26
Total protein (g/dl)	8.18 ± 0.13	6.58 ± 1.40
Albumin (g/dl)	4.25 ± 0.07	2.14 ± 0.97
Globulin (g/dl)	3.93 ± 0.07	4.50 ± 1.72
Glucose (mg/dl)	65.34 ± 2.10	71.98 ± 23.39
Cholesterol (mg/dl)	89.98 ± 6.98	158. 47 ± 61.30
Sodium (MEq/L)	114.82 ± 2.23	125.84 ± 49.32
Potassium (MEq/L)	3.27 ± 0.252	3.14 ± 2.09
Phosphorus (mg/dl)	2.16 ± 0.14	5.03 ± 3.99

Thirty three dogs were scanned and sonographic findings were thickened gall bladder wall in 24 dogs, hyperehoic liver in 19 dogs and ascites in 3 dogs. Thomas and Evans (1967) observed a gradual increase in the incidence of infection with appearance of sonographic abnormalities like diffuse hyperechogenicity of the liver, diffuse fibrosis, cirrhosis with bumps of irregularities on liver surface margin and ascites. The possible causes of gallbladder thickening reported include hepatitis, cystitis, gall bladder tumor, hypoproteinemia etc (Spaulding, 1993).

Nephrosonography revealed presence of indistinct cortico-medullary distinction in 20 dogs, absence in 9 dogs, hyperechoic cortex in 12 dogs, medullary band (Hyperechoic medulla) in 3 dogs, pyelectasia in 4 dogs and hyperechoic medullary rim sign in 2 dogs. Three dogs had a distinct wide band of increased echogenicity in the medullary region and 2 dogs exhibited an outer medularry linear echogenic zone (Renal Medullary Rim Sign). Nephrosonographic findings identified in this study are increased cortical echogenicity and pyelectasia are non-specific. Pyelectasia can be physiologic, secondary to diuresis (Pugh *et al.*, 1994). Histologically, Medullary band was associated with haemorrhage, congestion, oedema and necrosis. Medullary band (both sonographically and necropsy) has only been seen in dogs with renal form of leptospirosis (Forrest *et al.*, 1998). Armbrust *et al.*, (2001) reported renalmegaly, pyelectasia, increased cortical echogenicity, perinephric fluid and medullary rim sign in cases of leptospirosis. The medullary band and medullary rim sign are specific sonographic signs for leptospirosis in dogs.

Gross pathological changes observed were hepatomegaly with mottled appearance in 2 dogs (20%), yellowish brown to grayish discoloration in 5 dogs (50%) and multiple nodules in 6(60%) dogs. Monlux (1948) reported that liver was pale, slightly more friable, multiple petechial and ecchymotic haemorrhages in the hepatic

duct system. Histopathological changes of liver were moderate to marked congestion of the sinusoids in 7 dogs (70%), varying degree of degenerative changes in 5 dogs (50%), bile duct hyperplasia with focal to multifocal areas of mononuclear cell infiltrations in 5 dogs (50%) and a solitary case of periportal cirrhosis in 1 dog (10%). Birnbaum *et al.,* (1998) recorded severe dissociation of hepatocytes, perivenous oedema, and neutrophilic infiltration in the liver.

Gross pathological changes observed were kidney enlargement in 2 dogs (20%), capsular adhesion to the cortex in 7 dogs (70%), vascular changes in the cortex with focal to multifocal areas of whitish to grayish discolouration in 5 dogs (50%). Confer and Panciera (1997) stated that in diffuse interstitial nephritis, kidneys were swollen and pale, with a random gray mottling seen from the capsular surface. Histopathological changes of kidney were mild to severe congestion in 7 dogs (70%), cystic dilatation of tubules in 2 dogs (20%), tubular necrosis in 1 dog (10%), glomerular atrophy with scattered interstitial lymphoplasmacytic in 2 dogs (20%), multifocal interstitial mononuclear infiltration in 2 dogs (20 %) & neutrophilic infiltration in 5 dogs (50%). Birnbaum *et al.,* (1998) recorded a moderate to severe, primarily lymphoplasmacytic and neutrophilic tubulointerstitial nephritis.

In conclusion, canine leptospirosis was prevalent more than previously thought and a recent shift in the serovars had left vaccinated dogs at risk because immunity was serovar specific

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Efficacy of zinc supplementation in clinical management of demodicosis in dogs

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Abstract

Serum zinc level was significantly decreased in demodectic dogs. Zinc supplementation brought about speedy recovery with over all clinical improvement as compared to non supplement dogs.

Keywords: Demodicosis, Dogs, Ivermectin, Treatment.

Dogs with generalized demodicosis may have a marked decrease in T- lymphocytes. These dogs also have decreased interleukin -2 production which is important in leukocyte blastogenesis, it activates and sustain T- lymphocyte function (Lemarie., *et al.* 1996). Factors like environment, infectious disease, ectoendoparasitic infection, deficiency of certain vitamins, minerals, etc cause immunosupression.

Zinc is a co-factor in many enzymes system, essential for DNA/RNA polymerase, stabilizes cells and lysosomes and is involved in several immune mechanism (Attri *et al.*, 2006). Considering the role of zinc in immunomodulation, it was proposed to evaluate the serum zinc levels in demodectic dogs before and after zinc supplementation along with standard miticidal preparation.

The dogs attending teaching veterinary clinical complex of the college with the complaint of various skin problems were subjected through clinical examination. Skin scrapings were collected, processed and examined microscopically. Total 12 dogs confirmed positive for *Demodex canis* infection were divided in two equal groups irrespective of their age, sex and breed.Dogs of group I were treated with Ivermectin @ 400µg/kg b. wt. sc at weekly interval till recovery. Group II received ivermectin weekly at the same dose with zinc sulphate@2mg/kg b. wt. orally daily till recovery.

The skin scrapings were examined and mite count was carried out before treatment (0^{th} day) and at weekly interval till recovery to assess the efficacy of treatment. On the same days, blood samples were also collected to estimate serum zinc level as per the procedure suggested by Kolmer *et al* (1995).

There was no significant difference in mite count on day 0 in group I and II but zinc level in both groups on day 0 was below normal (Allen *et. al*., 1993).

Zinc deficiency can result from inadequate level of minerals in the diet also due to the presence of other nutrients that may interfere with zinc absorption (Thoday, 1989). Low zinc level might be a contributing factor for immunosupression leading to the flare up of mite population and establishing the disease condition Pal *et.al.* (1995) and Attri *et, al.* (2006) also reported significantly low level of serum zinc in dogs suffering from demodicosis.

Due to the miticidal effect of ivermectin the mite count in group I decreased significantly by 29.82, 62.23 and 75.68% on days 7,14 & 21, respectively and simultaneously brought about clinical improvement. The mite count was totally zero for 4 dogs however in remaining 2 dogs with generalized form of demodicosis, it reach to nil on 35^{th} day. These finding are in agreement with Yathiraj *et al*., (1991) and Kamboj *et al.,* (1993) who also reported recovery by 3 to 5 injections of ivermectin in demodectic dogs.

In group II, mite count decreased significantly on 7^{th} day of treatment however much better result were obtained on 14^{th} and 21^{st} day which can be attributed to the time required for gut absorption of the zinc and its availability to the tissue resulting in subsequent improvement in immune response of the body.

The serum zinc level of group I remained low throughout observation period but in group II it reached about normal by day 35. The improved serum zinc level definitely might have contributed to build up the self resistance by virtue of stimulating immune response which can be observed from the difference in degree of mite count in dogs from group I & II.

Table 1. Mite count and serum zinc level (mean ± SE) before and after treatment on different days

Parameter	Group	Days of observation					
		0	7	14	21	28	35
Mite count	I	6.17 ± 0.65	4.33 ± 0.67	2.33 ± 0.56	1.50 ± 0.22	1.15 ± 0.14	——
	II	6.33 ± 0.42	4.00 ± 0.37	2.00 ± 0.26	1.17 ± 0.17	——	——
Zn concentration	I	56.36 ± 2.20	56.48 ± 2.22	56.97 ± 2.40	56.81 ± 2.23	56.91 ± 2.26	57.18 ± 2.70
	II	58.17 ± 1.95	65.43 ± 1.67	69.62 ± 1.54	71.98 ± 0.84	72.59 ± 0.79	73.85 ± 0.97

The zinc supplementation might have helped to boost up the body immune system thereby hastening the process of clinical improvement in the form of hair growth, skin luster and repairment of lesion of demodicosis. These finding corroborates the findings of Columbini and Dustan (1997) who recorded complete resolution of demodicosis lesions with oral zinc supplementation in dogs.

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Effect of polyherb supplementation on production in laying birds

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Abstract

The present investigation was undertaken to evaluate the effect of herbal supplementation on blood profile and production performance of birds. The diets were supplemented with 0.5% each of *Asparagus racemosus*, *Nigella sativa* and *Leptadenia reticulata* in gr I while gr II was given normal commercial feed. Polyherb supplementation resulted in increase egg production, body weight gain and feed intake. There was significant increase in Hb, PCV, TEC, TLC as well as total plasma protein, plasma globulin level and calcium in polyherb supplemented birds. Plasma glucose level was significantly reduced whereas activity of plasma enzymes AST, ALT and ALP did not revealed significant variation.

Keywords: Biochemical changes, Haematology, Polyherbal therapy, Poultry, Production

Poultry and poultry products are one of the important sources of animal protein in human diet. Many plants have been enhancing productivity in birds and have been incorporated in some commercially available herbal products used in poultry production. The herbs improve digestive function and feed utilization, provide nutrients and reduce bacterial and worm load as well as effects of stress. All these factors improve weight gain in broiler and egg production in layer birds (Shabir and Shakoor, 1999).

Some Ayurvedic preparations are used as growth promoters and immuno-stimulants. Many herbal products have been tried to increase the milk production in diary animals and weight gain and egg production in poultry. *Nigella sativa* seeds significantly increased egg production, egg mass and reduction in serum triglycerides, low density lipoprotein, and cholesterol in layers (Akhtar *et al.*, 2003). The present paper reports efficacy of polyherbal supplementation on the production performance of laying birds.

Materials and Methods

The roots of *Asparagus racemosus* purchased from Medicinal Research and Development Center Pantnagar, *Negilla sativa* seeds and *Leptadenia reticulata* plant purchased from local market, were identified and authenticated from Department of Biological Sciences of the University. The plant materials were cleaned, shade dried and then dried in incubator at 40°C for 3-4 days to remove excess moisture. These were grinded in mixer to obtain a fine homogenous powder.

Total 40 birds of 6 month age were procured from instructional poultry farm of the university and kept in deep litter system and given commercial layer ration and water *ad libitum*. The birds were adjusted for 2 weeks and then divided in 2 equal groups. Gr I was fed with polyherb mixture which consists of 0.5% each of *A. racemosus, N. sativa, and L. reticulate* after mixing in commercial layer ration whereas gr II was fed with normal commercial feed upto 8 weeks.

Egg production, feed intake and mortality if any, were recorded daily throughout the experimental period. The data on weight gain were calculated fortnightly. Haematological profile i.e. PCV, Hb, TEC, TLC and DLC were studied by standard methods. From the values of PCV, Hb and TEC, erythrocytic indices (MCV, MCH and MCHC) were calculated. Biochemical parameters *viz.* glucose (Sacks, 1998), total protein, albumin, globulin, albumin-globulin ratio (Johnson *et al.*, 1999), total cholesterol, calcium, phosphorus and activities of aspartate aminotransferase (AST), alanine aminotransferase (ALT) and alkaline phosphatase (ALP) by methods of Kind and Kings, (1954) were estimated at weekly intervals. Statistical analysis of the data was done using ANOVA technique according to the method described by Snedecor and Cochran (1994).

Results and Discussion

Polyherb supplementation in layer feed increased egg production from 80.71% to 90.35%, *i.e.* there was 10% increase in egg production. Similar findings were observed by Rekhate *et al.* (2004) by feeding *A. racemosus* root powder in poultry feed. Ishwer (1979) recorded increase in egg production by feeding Leptaden (Vet) which contains *L. reticulata*.

Table 1: Effect of supplementation of Polyherb in layers

Sl. No	Parameteres	Groups	0 Week	2 Week	4 Week	8 Week
1.	Haemoglobin (g/L)	I	85.7±0.53	88.3±0.88	90.6±1.20*	91.9±1.88*
		II	85.7±0.16	85.4±1.60	85.8±0.82	85.7±0.99
2.	T E C (10^{12}/L)	I	2.6±0.064	2.64±0.14	2.68±0.14*	2.7±0.05*
		II	2.58±0.06	2.59±0.04	2.61±0.09	2.61±0.06
3.	T L C (10^9/L)	I	17.45±0.16	17.66±0.17	18.37±0.12*	19.88±0.54*
		II	17.45±0.24	17.45±0.12	17.45±0.07	17.45±0.09
4.	Lymphocyte $\times10^9$/L)	I	10.42±0.18	10.68±0.34	10.79±0.31*	12.07±0.27*
		II	10.34±0.47	10.38±0.40	10.38±0.18	10.25±0.24
5.	Heterophil $\times10^9$/L)	I	4.842±0.16	4.988±0.08	5.235±0.20*	5.6204±0.50
		II	4.8845±0.21	4.886±0.16	4.842±0.07	4.9306±0.28
6.	P C V (L/L)	I	0.283±0.00	0.293±0.00	0.293±0.00*	0.308±0.00*
		II	0.283±0.00	0.285±0.000	0.2839±0.00	0.2846±0.00
7.	Glucose (mmol/L)	I	9.428±0.035	9.518±0.064	9.381±0.034	9.340±0.07*
		II	9.434±0.070	9.404±0.10	9.428±0.03	9.447±0.06
8.	Total Protein (g/L)	I	59.2±0.43	60.4±2.16	62.2±0.94*	65.3±1.39*
		II	59.1±0.24	59.0±5.54	59.2±1.06	59.2±1.76
9.	Albumin (g/L)	I	35.2±1.00	34.6±1.14	34.4±0.32	33.8±0.63
		II	35.1±0.29	35.2±0.63	35±0.56	35.2±0.94
10.	Globulin (g/L)	I	24.0±1.41	25.8±1.01	27.8±0.61*	31.5±1.93*
		II	24.0±0.43	23.8±6.15	24.2±0.50	24±0.92
11.	Calcium (mmol/L)	I	2.125±0.03	2.17±0.03	2.212±0.10	2.4675±0.41*
		II	2.130±0.05	2.130±0.00	2.157±0.07	2.16±0.06

Value having * differ significantly (P<0.05) in a column.

Inclusion of black cumin (*N. sativa*) seeds in the diet to a level of 1.5% raised egg production from 59 to 77% (Akhtar *et al.*, 2003). However El Bagir *et al.* (2006) noticed reduction in egg production by 16% due to treatment with black cumin.

The birds receiving polyherb supplementation revealed significant increases in average feed intake (103.05g) and body weight (1.417 kg) as compared to control group. The birds receiving polyherb supplementation revealed significant increases in Hb, PCV, TEC, TLC and lymphocyte count with no significant effect on MCV, MCH and MCHC values (Table 1). Rekhate *et al.* (2004) observed significant rise in haemoglobin, serum total protein and globulin in birds fed with *A. racemosus*. There was significant decrease in glucose level which might be due to the regulatory effect of herbal constituents on blood glucose metabolism. Govindarajan *et al.* (2004) reported that *A. racemosus* root extract reduces the blood glucose levels.

In birds of gr I, significant increase in total plasma protein, plasma globulin and calcium level were recorded whereas albumin level revealed non significant reduction (Table 1). Increased egg production requires more albumen and relative increase in globulin which may be due to increased level of immunoglobulin showing increased immune status of bird. Increased calcium level may be due to high calcium content in *A. racemosus* or due to increase in absorption of calcium from the intestine. Polyherb feeding did not show any effect on plasma cholesterol level though Akhtar *et al.* (2003) reported that *N. sativa* seeds significantly reduced serum triglycerides, low density lipoprotein, and cholesterol in layers. Nabiela *et al.* (2006) noticed 15 and 23% reduction in serum cholesterol after feeding the diets mixied with 1 and 3% *N. sativa* seeds, respectively. El Bagir *et al.* (2006) also reported 20%

reduction in serum cholesterol in birds receiving *N. sativa* seeds.

Polyherbal supplementation in the diet did not revealed any significant effect on phosphorus and plasma enzymes, i.e. AST, ALT and ALP. Increase in feed intake was observed in birds receiving polyherb as observed by Rekhate *et al.* (2004) and Chopra *et al.* (1952) also. Ishwer (1979) reported slightly higher weight gain in broiler and increased egg production in layers on feeding herbal preparation Leptaden (Vet) which constitutes *L. reticulata* as one of its constituent. Akhtar *et al.* (2003) reported that feeding of *N. sativa* results in better feed utilization. On the basis of above findings, it was concluded that the supplementation of polyherb in the diet increases egg production, better feed utilization and also improves general health status of the birds.

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Haemato-biochemical changes in dogs suffering from renal failure

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Abstract

Kidney function tests are useful to detect the nature and magnitudecases and the extent of impairment of renal function. The present study reports the changes in haematology, serum creatinine and urea nitrogen in 31 renal failure in dog cases. Dogs with renal disorder revealed significantly lower TEC, haemoglobin, PCV, total leukocyte count, neutrophil count and lymphocyte count. A non-significant lower value of MCV and MCH were also observed in the dogs affected with renal failure dogs. Most important findings were the significantly increase in the value of serum creatinine and urea nitrogen in renal failure dogs as compared to healthy dogs.

Keywords: Biochemical changes, Dog, Haematology, Kidney function test, Renal failure

Renal failure is a common clinical problem occurring in 2-5 % of dogs (Bronson, 1982 and Lund *et al.,* 1999), third leading cause of death in dogs. Mean age of diagnosis is 6.5 years with 45% of cases reported over 10 years of age. Onset of renal failure tends to be insidious as renal function generally decline over a period of month to years and results in accumulation of the nitrogenous waste in the blood. Kidneys serve as the principal organ in maintenance of homeostasis, elimination of metabolic waste products of the body, regulation of extra-cellular fluid volume, blood pressure (by rennin-angiotensin system), and systemic pH (via regulation of H^+ and HCO_3^- concentration). In addition kidneys also play integral role in excretion of phosphorus, reabsorbtion of calcium, renal metabolism of vitamin D as well as regulation of erythrocyte mass under influence of renal erythropoietic factor (Shapiro and Schrier, 1992; Cotran and Kumar, 1999). The uremic syndrome manifests when the residual renal mass is generally less than 25% of normal and compensatory changes fail to meet the metabolic and excretory function of the body. For the diagnosis of renal disorders determination of non-protein substances, especially urea and creatnine is very important because significantly increased values are usually the result of accumulation of these substances in blood because of defective kidney elimination (Benjamin, 1986). This paper reports haemato-biochemical changes in dogs suffering from renal failure.

Materials and Methods

Total 15 apparently healthy non descript dogs of either sex, weighing about 21.78 ± 4.7 kg with height 39.33 ± 2.7 cm and age about 5.72 ± 1.3 year were used as healthy control in group I. Total 31 dogs of either sex, breed weighing about 19.64 ± 0.89 kg with height 36.53 ± 2.24 cm and age about 5.06 ± 0.27 year were identified as suffering from renal failure are classified as group II. More than 2.0 mg/dl concentration of serum creatinine level was considered as the inclusive criteria for the dogs in this group. For haemato-biochemical studies, 6 ml of blood sample was collected from each animal, and immediately after collection of blood, 2 ml was transferred to EDTA vials and remaining 4 ml was kept for harvesting of the serum for estimation of biochemical profiles.

Haemoglobin concentration (Hb -gm/dl), packed cell volume (PCV-%), total erythrocyte count (TEC -10^6/µl), total leukocyte count (TLC - 10^3/µl), differential leucocyte count (DLC-%) and erythrocytic indices (MCV-fl. MCH-pg and MCHC-%) were determined as per the standard procedures outlined by Jain (1986) within 2 hr of blood collection. Serum samples were subjected to analysis for urea Nitrogen (Wooten, 1964) and serum creatinine (Hawk, 1988). The data were statistically analyzed using standard paired 't' test (Snedecor and Cochran, 1976)

Results and Discussion

The dogs suffering from renal failure showed significantly lower value of TEC, hemoglobin and PCV than healthy dogs (table-1). These findings suggest that affected dogs were suffering from anemia, which might have been developed due to the depressed renal erythropoietin factor (REF) production from impaired kidney, loss of blood in the form of haematemesis or

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Table 1: Haemato-biochemical changes in dogs suffering from renal failure (mean± S.D)

Parameters	Group I (n=15)	Group II (n=31)
TEC ($x10^6$/µl)	6.00 ± 0.51	4.18 ± 0.99**
Hb (g/dl)	13.00 ± 0.93	7.58 ± 1.65**
TLC ($x10^3$/µl)	12.23 ± 1.15	21.28 ± 10.34*
N (%)	70.90 ± 3.05	78.15 ± 8.38*
E (%)	1.10 ± 0.79	2.69 ± 5.75^{NS}
L (%)	27.00 ± 3.06	16.92 ± 7.43*
M (%)	1.16 ± 0.86	2.23 ± 1.02 ^{NS}
Platelets ($x10^6$/µl)	3.16 ± 0.52	2.22 ± 1.32*
PCV (%)	39.67 ± 1.96	24.79 ± 4.55**
MCV (fl)	66.51 ± 4.02	60.39 ± 7.02 ^{NS}
MCH (pg)	21.96 ± 1.61	19.44 ± 2.91 ^{NS}
MCHC (%)	32.17 ± 1.76	30.68 ± 4.83 ^{NS}
Serum creatinine (mg/dl)	1.24 ± 0.18	8.42 ± 6.13**
BUN (mg/dl)	15.90 ± 1.67	68.97 ± 27.26**

*Significant at 5% level; **Highly significant at 1% level

melena and decreased RBCs survival time as an upshot of uremic intoxication. These observations were in accordance with Osborne *et al.,* (1972). Mean values of TLC were significantly higher in renal failure dogs than healthy dogs (Table-1). This elevation in TLC might be due to the primary inflammatory disease of urinary system and involvement of other body system and tissues (Osborne *et al.,* 1972). The leukocytosis observed in the dogs of group II has been reported to be infectious or non-infectious in nature (Osborne and Finco, 1995).

Differential count revealed a significant rise in neutrophil count, non-significant rise in eosinophils and significant decrease in lymphocyte count in the dogs suffering from renal failure as compared to healthy dogs (table-1). These haematological changes are usually observed in the generalized renal disease and are in agreement with Osborne *et al.* (1972) who reported the similar findings in the dogs with renal failure. The significant reduction in platelet count in renal failure affected dogs (Table-1) as compared to healthy dogs was indicative for thrombocytopenia. The significant reduction of platelets could be because of uremic intoxication (Benjamin, 1986).

The observation of lower value of MCV and MCH albeit non-significant in renal failure dogs in comparison to dogs in control group were suggestive of normocytic and normochromic anemia in renal failure affected dogs. These observations are in accordance with the observation of Osborne *et al.* (1972), who reported the similar findings in the dogs with renal failure.

The parameter of renal function tests revealed significantly increase in the value of serum creatinine and urea nitrogen in dogs affected with renal failure as compared to healthy dogs of group I. The finding of hypercreatinemia and azotemia in dogs of group II may be attributed to the impaired filtration process as a consequence of loss of physiological function of the nephrons. About 70-75% of the nephrons must be nonfunctional before its values rise above the normal range (Krawiec *et al.,* 1986). Creatinine is efficient for monitoring the progression of CRF (Allen *et al.,* 1987) or the efficiency of a treatment (Mashita *et al.,* 1997); with the critical difference of 0.4 mg/dl in the range of normal values (Jensen and Aaes, 1993).The augmented value of urea may be due to the facts that urea can not utilized or excreted to any significant degree by organ other than kidney, low rate of urine flow enhance tubular absorption of urea (Osborne *et al.,* 1972) and endogenous source such as rapid catabolism of body tissue (fever, infection etc.) or GIT bleeding.

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Effect of haemodialysis on haemato-biochemical changes in dogs suffering from acute renal failure

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Abstract

The present investigation was undertaken to record the efficacy of haematodialysis in maintaining azotania in acute renal failure. Out of 421 clinical cases of dogs, 20 cases (4.75%) of acute renal failures were diagnosed and divided into 4 groups of 5 dogs each. Haemodialysis was performed for 30, 45, 60 and 90 min per day for 5 days in gr T_1, T_2, T_3, and T_4, respectively. Haematological and bio-chemical parameters were determined on day 0, 3, 5 and 10 of diagnosis. Increased serum creatinine and blood urea nitrogen levels reduced significantly towards normal levels after haemodialysis. Heamodialysis for 60 min per day for 5 days showed most promising result in respect to reduction in these parameters.

Keywords: Acute renal failure, Biochemical changes, Haemodialysis dog.

Renal failure is one of the most common ailments and its management is important in dogs. Both serum creatinine and urea nitrogen are increased in direct proportion to the severity of the renal impairments. When the conservative therapy becomes non-responsive in renal failure cases, then the kidneys require rest and some artificial means of removal of uremic toxin become essential. Haemodialysis is technically feasible, safe, efficacious and indispensable for the management of both dogs and cats with life threatening uremia (Cowgill, 2003) and it has been investigated in present study.

Materials and Methods

Among 421 general clinical cases of dogs, 20 cases (4.75%) were diagnosed as of acute renal failure (ARF).These cases were divided into 4 groups of 5 dogs each. Dogs having serum creatinine and blood urea nitrogen more than 2 mg/dl and 30 mg/dl, respectively, were considered as suffering from renal failure.

For haematological parameters, 5ml blood was collected in sterile vials with EDTA and Hb, PCV, TEC and TLC using Sysmex® KX-21 Automatic multiparameter blood cell counter and DLC (Schalm *et al.*, 1975) were estimated. Bio-chemical parameters (total protein, serum albumin, serum creatinine, blood urea nitrogen, serum glucose, serum calcium and serum phosphorus were determined using Auto analyzer Erba Mannheim Chem-5 plus V2 and serum sodium, potassium and chloride levels estimated using Easylyte plus K/Na/Cl analyzer. These haemato-biochemical parameters were studied on day 0, 3, 5 and 10 of haemodialysis.

Haemodialysis was performed for 30, 45, 60 and 90 min per day for 5 days in gr T_1, T_2, T_3 and T_4, respectively as per the method described byTani (1993).The results were statistically analyzed using standard method (Snedecor and Cochran, 1994).

Results and Discussion

Mean values of Hb, PCV, TEC, TLC and DLC before and after treatment in different groups revealed non-significant variation with moderate leukocytosis, neutrophilia and mild lymphopenia. The mean values of serum creatinine and blood urea nitrogen were higher in all the dogs before treatment. There was significant reduction in these parameters after treatment (Table1). Creatinine is formed in the muscle from non- enzymatic degradation of creatine and is freely filtered by the glomerulus and appears in the same concentration as in plasma. Creatinine is neither reabsorbed nor secreted by the tubules of the kidneys (Finco, 1990), also formation of creatinine is not affected by dietary proteins, protein metabolism, age, sex or exercise (Benjamin, 1998). Hence rise in serum creatinine levels is considered a sure indicative of kidney dysfunction.

Urea is a non-protein nitrogenous substance produced by the liver from ammonia during catabolism of amino acid and excreted exclusively by the kidney (Osborne and Polzin, 1994; Finco, 1990). Urea is distributed throughout total body water and is equal in concentration in the intracellular and extracellular fluid. Thus its concentration is the same in whole blood, plasma and serum. Abnormal elevation in the concentration of BUN occurs as a result of impairment of renal function. There was maximum reduction in

Table1: Biochemical values (mean±SE) of different groups of dogs before and following treatment with haemodialysis

Parameters	Gr	T_1	T_2	T_3	T_4
Serum creatinine (mg/dl)	0 Day	4.95±0.04[a]	5.52±0.14[b]	6.41±0.06[c]	7.02±0.17[d]
	3rd Day	2.89±0.02[d]	2.60±0.07[c]	2.56±0.04[b]	2.04±0.03[a]
	5th Day	1.99±0.04[c]	1.63±0.04[b]	1.55±0.04[b]	1.29±0.05[a]
	10th Day	1.69±0.05[c]	1.01±0.06[b]	0.93±0.05[b]	0.83±0.05[a]
Blood Urea Nitrogen (mg/dl)	0 Day	95.16±2.27[a]	99.42±3.84[a]	115.00±2.17[b]	124.24±4.32[b]
	3rd Day	73.40±2.33[c]	62.56±2.67[b]	51.74±1.20[a]	52.80±5.06[a]
	5th Day	31.00±2.12	27.18±1.11	24.48±3.26	26.70±3.76
	10th Day	26.98±1.42[c]	24.18±1.40b[c]	18.76±0.85[a]	21.87±1.95[b]
serum glucose (mg/dl)	0 Day	69.28±1.26[c]	67.71±1.45[b]	59.22±1.91[a]	62.58±2.12[ab]
	3rd Day	70.02±1.55	70.26±2.48	66.38±1.31	67.47±1.72
	5th Day	72.59±1.70	73.16±1.71	69.60±2.00	65.47±1.05
	10th Day	75.38±3.30	75.14±3.55	71.08±3.16	67.72±2.51
Serum Phosphorus (mg/dl)	0 Day	5.67±0.26[a]	6.63±0.28[a]	7.53±0.32[b]	7.54±0.49[b]
	3 Days	5.23±0.31	5.86±0.29	6.12±0.43	6.32±0.49
	5 Day	4.75±0.24	5.40±0.34	5.45±0.24	5.10±0.55
	10 Day	4.71±0.23	5.12±0.26	4.62±0.24	4.89±0.48

Values bearing same superscript in a row did not differ significantly.

serum creatinine in dogs where haemodialysis was done for 90 min daily for five consecutive days, but 2 dogs in this group died. However, dogs where haemodialysis was done 1st 60 min daily for 5 consecutive days showed better result as it was without any casualty and there was considerable reduction in serum creatinine and blood urea nitrogen level. Tadahisa *et al.* (1997) performed short term haemodialysis treatment who found reduction of serum creatinine level 42.5 to 58.7% with haemodialysis of 2 hr. Hanju *et al.* (2003) found reduction in serum creatinine level from 11.3±5.2 mg/dl to 4.8±2.8 mg/dl after intensive haemodialysis.

The mean values of serum glucose, total serum protein and serum albumin showed no significant change following treatment. There was slight increase in serum calcium level on day 10 in comparison to day 0 in all the groups but the changes were non significant. The mean value of serum phosphorus level on day 0 in T_3 and T_4 group showed significantly ($P<0.01$) higher level than T_1 and T_2 group (Table1). There were reductions in serum phosphorus level after treatment but the changes were non-significant. These findings indicate the probability of increased calcitrol production by the repaired kidney and increased PTH levels due to hyperphosphatemia developed due to renal damage (Nandy and Pradhan, 2006). Due to recovery of renal function the excretion of phosphorus through urine was normalized leading to gradual decrease in serum phosphorus level towards normal level following treatment. Cowgill and Francy (2005) reported that in acute renal failure serum phosphate concentration generally exceeds that of creatinine and may be associated with mild to moderate hypocalcaemia.

Higher value of potassium was observed on day 0. During the treatment the serum potassium levels declined subsequently, but the changes were statistically non-significant. Hyperkalemia is a frequent complication of ARF resulting from decreased excretion, metabolic acidosis, tissue injury, haemolysis and increased tissue catabolism (Mary, 1992). Parker (1981) recorded that equilibrium of potassium was over 90% completed after the first 40 minutes and 98% by the end of the 1st hour. The mean value of serum sodium and chloride did not differ significantly.

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Comparative efficacy of anthelmintics against clinical gastrointestinal nematodiosis in swamp buffalo

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Abstract

Comparative efficacy of anthelmintics against gastro-intestinal nemadatodiosis in buffaloes revealed that single subcutaneous administration of ivermectin was more efficacious (78.00%) with early reduction of EPG then single oral administration of albendazole (75.00%) and ivermectin (65.90%). The health and haemogram of treated animals gradually improved as compared to untreated infected control.

Keywords: GI nematodiosis, Haematological changes, Swamp buffaloes, Treatment

Chemotherapeutic control of gastrointestinal nematodiosis in buffalaoes has been reported by several workers (Bagherwal, 1992 and Waghmare *et al.,* 1993). However, there has been limited information regarding the anthelmintic efficacy and haematological changes in buffaloes from the north-eastern region that possesses a large number of buffalo population. This paper reports comparative efficacy of anthelmintics on the basis of reduction of EPG and haematological changes.

Materials and Methods

Total 32 adult buffaloes of either sex or positive for GI nematodiosis were divided into 4 groups of 8 animals each. The animals of gr I, II and III received ivermectin* (@ 200 ug/kg b wt sc), albendazole** (@ 5 mg/kg b wt orally) and ivermectin*** (@ 200 ug/kg b wt orally) while gr IV served as control. Liver tonic and B complex was given as supportive therapy to the treated animals.

The faecal and blood samples were collected from all the animals on day 0, 1, 3, 7, 10, 14, 17 and 21 for EPG counts and haematological examinat ion (Hb, PCV, TEC, DLC and MCV) by standards methods. Statistical analysis of data was done as per Snedecor and Cochram (1994).

Results and Discussion

The EPG in animals of gr I, II, and III became nil on day 7, 10 and 14, respectively, while in gr IV, it increased progressively. The overall efficacy of ivermectin injection and oral administration of albendazole and ivermectin was 78.00, 75.00 and 65.90%, respectively.

Islam *et al.* (2003) and Rajkhowa *et al.* (2004) recorded 100.00% efficacy of injectable ivermectin against gastrointestinal nematodes as noticed in present study also. Albendazole has good ovicidal property and is highly efficatious in the treatment of gastrointestinal nemadotodes (Soulsby, 1982).

Besides reduction of EPG in treated groups, there was also clinical improvement as evidenced by disappearance of diarrhoea, dullness and depression, animals regained appetite, developed prolonged grazing habits, become relatively active and body coat appeared smooth. Similar findings were also observed by other workers (Islam *et al.*, 2003; Galdhar *et al.,* 2003). The untreated control animals remained debilitated, severely anaemic and diarrhoeic throughout the study period.

Changes in the value of Hb, PCV, TEC, MCV, neutrophil, lymphocyte, eosinophil and monocyte in different days as well as different groups after treatment were found to be highly significant ($P<0.01$). The level of all haematological parameters (Table 1) reflected as tendency to return towards normal level at the end of the study period. The findings of the haematological parameters in the present study coincided with the findings of Waghmare *et al.* (1993) in buffaloes, Islam *et al.* (2003) in calves and Rajkhowa

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*Marketed as Ivernectin: by M/B Indian Immuknological Limited , Hyderabad-500033, ** Marketed as Expell: by M/B Excell Formulations Private Limited, Old Mumbai, Pune Road, Thane-400601, *** Marketed as Endectin: by M/B Excell Formulations Private Limited, Old Mumbai, Pune Road, Thane-400601.

Table 1: Mean± standards error (SE) of the different haemogram values in pre-treatment and on post-treatment with anthelmintics in swamp buffaloes.

Parameters	Groups	Pre-treatment Values (Zero day)	Post-treatment Values (21st day)
Hb g %	I	$9.05^{a}_{A} \pm 0.09$	$12.93^{a}_{A} \pm 0.18$
	II	$9.35^{a}_{A} \pm 0.22$	$12.53^{a}_{AB} \pm 0.18$
	III	$9.38^{a}_{A} \pm 0.12$	$12.20^{a}_{A} \pm 0.16$
	IV	$9.36^{a}_{A} \pm 0.17$	$9.05^{a}_{B} \pm 0.06$
PCV %	I	$32.25^{a}_{A} \pm 0.37$	$39.25^{b}_{A} \pm 0.31$
	II	$32.25^{a}_{A} \pm 0.73$	$40.13^{b}_{A} \pm 0.40$
	III	$30.75^{a}_{B} \pm 0.31$	$39.00^{b}_{A} \pm 0.31$
	IV	$31.25^{a}_{AB} \pm 0.75$	$32.75^{b}_{B} \pm 0.25$
TEC 10^6/cu mm	I	$4.29^{a}_{A} \pm 0.03$	$5.87^{b}_{A} \pm 0.09$
	II	$4.35^{a}_{A} \pm 0.05$	$6.08^{b}_{A} \pm 0.09$
	III	$4.31^{a}_{A} \pm 0.04$	$6.01^{b}_{A} \pm 0.09$
	IV	$4.36^{a}_{A} \pm 0.06$	$4.17^{a}_{B} \pm 0.05$
MCV cuμ	I	$75.22^{a}_{A} \pm 0.45$	$67.04^{b}_{A} \pm 1.22$
	II	$74.28^{a}_{AB} \pm 1.92$	$66.06^{b}_{AB} \pm 0.89$
	III	$71.44^{a}_{B} \pm 1.04$	$65.03^{b}_{A} \pm 1.36$
	IV	$71.63^{a}_{B} \pm 1.00$	$78.59^{b}_{B} \pm 0.80$
DLC (Neutrophil %)	I	$23.38^{a}_{A} \pm 0.86$	$31.38^{b}_{A} \pm 0.63$
	II	$21.75^{a}_{AB} \pm 0.92$	$30.50^{b}_{AB} \pm 0.63$
	III	$22.50^{a}_{AB} \pm 1.31$	$29.88^{b}_{AB} \pm 0.44$
	IV	$26.25^{a}_{B} \pm 0.75$	$28.50^{b}_{B} \pm 0.73$
DLC (Lymphocyte %)	I	$67.38^{a}_{A} \pm 0.80$	$60.00^{b}_{A} \pm 0.57$
	II	$67.88^{a}_{A} \pm 0.64$	$60.75^{b}_{A} \pm 0.59$
	III	$67.25^{a}_{A} \pm 1.22$	$61.13^{a}_{A} \pm 0.48$
	IV	$64.75^{a}_{B} \pm 0.10$	$60.25^{b}_{A} \pm 0.70$
DLC (Eosinophil %)	I	$6.63^{a}_{A} \pm 0.26$	$3.00^{b}_{A} \pm 0.00$
	II	$6.75^{a}_{A} \pm 0.37$	$3.13^{b}_{A} \pm 0.13$
	III	$6.75^{a}_{A} \pm 0.25$	$3.25^{b}_{A} \pm 0.16$
	IV	$6.38^{a}_{A} \pm 0.26$	$6.63^{a}_{B} \pm 0.18$
DLC (Monocyte %)	I	$2.63^{a} \pm 0.38$	$5.63^{b} \pm 0.18$
	II	$3.63^{a} \pm 0.50$	$5.62^{b} \pm 0.18$
	III	$3.50^{a} \pm 0.33$	$5.75^{b} \pm 0.16$
	IV	$2.63^{a} \pm 0.49$	$4.63^{b} \pm 0.18$

* values with different suffix denote significant difference

et al. (2004) in mithun.

Analysis of the present findings indicated that animals in all the groups were suffering from anaemia at the beginning of the experiment, probably due to clinical gastrointestinal parasitism. After administration of anthelmintis, liver extracts and oral feed supplements to all the animals belonging to gr I, II and III, the anaemia was appeared to reverse, which was however, not the case with the untreated animals in gr IV.

Anaemia has been seen after prolong infection with non-blood sucking gastrointestinal nematodes and probably resulted due to the deficiency in the amino acids srequjired for haemoglobin synthesis (Soulsby, 1982). However, in gastrointestinal nematodiosis caused by those blood sucking *Haemonchus*, anaemia has been a major feature, which clinically manifested by rapid

drop of PCV. As the disease progressed, there might have occurred a severe depletion of iron reserves. Dargie and Allonby (1975) showed that sheep infected with *Haemonchus* exhibited low serum iron, low bone marrow reserve of iron, which resulted into anaemia, rapid drop of PCV and dyshaemopoiesis due to iron deficiency. In the present study, the animals in all the groups had low haemoglobin concentration, low PCV and TEC values, which indicated of anaemia. This type of anaemia has been transitory and commonly observed in the recovery stages of the disease in the animals or in those animals, which suffered from acute blood loss (Clark *et al.,* 1962). Thus from the present study, subcutaneous administration of ivermectin was appeared to be clinically more effective against gastrointestinal nematodiosis in swamp buffaloes.

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Occurrence of Peste Des Petits ruminnats in small ruminants of Jammu division

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Abstract

Analysis of 200 sera samples (61 of sheep and 139 of goat) by C-EL1SA, revealed overall 41.0% prevalence of PPR both sheep and goat. The prevalence was high in goats of 1-2 yr age and sheep below 1 yr age. Both males and females in organized and unorganized sectors were equally affected. The seroprevalence was higher in goats in Jammu (46.0%) and in Kathua district in sheep (55.6%)

Keywords: C- ELISA , Goat, Peste des petits ruminants, Sheep.

Sheep and goat husbandry play a significant role in sustaining the rural economy of India. Peste des petits ruminants (PPR) is a highly contagious disease of small ruminants considered to be one of the major health hazard affecting the productivity (Stem, 1993). The epidemics of PPR have been recorded from 1992 to 1999 in 16 states including J & K with case fatality rates of 3.1 to 51.5%. The present paper provides information on the status of PPR in small ruminants of four districts viz. Jammu, Udhampur, Kathua and Samba of Jammu division.

Materials and Methods

The present sero-epidemiological study was carried out from November 2007 to March 2008. Blood samples from sheep and goats and data related to age, sex and managemental system (organized/unorganized farms) were collected from Jammu, Kathua, Udhampur and Samba districts of Jammu province. In all, 200 blood samples (61 from sheep and 139 from goat) were collected. The separated serum samples were stored at -20°C till analysis. The Competitive ELISA for diagnosis of PPR was performed at Division of Virology, IVRI, Mukteshwar (Uttarakhand) as per procedure of Singh *et al.* (2004 a).

The optical density (OD) reading was taken at 492 nm on ELISA plate reader. The sample was classified as positive if the mean OD of test sample was more than twice that of mean OD of known negative serum. Statistical analysis of data was done by chi-square proportion test (Snedechor and Cochran (1994).

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Results and Discussion

A total of 200 samples were tested out of which 82 (41.0%) were found positive for PPR. The prevalence of PPR differed non-significantly between species with 38.8% and 45.9% of PPR in goat and sheep, respectively. Similar findings were reported by Singh *et al.* (2004b) who reported an overall seroprevalence of 39.6% from the state of J & K with 40.7% and 38.1% seropositivity in sheep and goat, respectively. The higher seropositivity in sheep can be due to the fact that the disease is more severe in goats as compared to sheep (Radostits *et al,* 2000); hence, more number of infected animals survived the infection in sheep, and increased the seroprevalence.

The prevalence of PPR was highest in the goats of 1-2 years age group (44.6%) followed by >2 year (38.1%) and <1 year age group (31.7%) (Table 1). Similar observations of higher prevalence of PPR in animals above 1 year of age than in young stock have been reported by Tahir *et al.* (2000). The presence of colostral antibodies in the young ones of exposed females also provides immunity to the young ones (Radostits *et al.,* 2000). In sheep, the prevalence of PPR was highest in the<l year of age group (66.7%) followed by 1-2 years (39.3%) and >2 years (33.3%) age groups (Table 1). This may be due to the fact that in young sheep the disease was less severe and therefore survival rate was higher. Statistically, the prevalence between various age groups within a species differed non-significantly from one another. On comparing the species within an age group, the prevalence in sheep of<l year age group was found to be significantly

Table 1: Age wise seroprevalence of PPR in goats and sheep

Age (year)	Goat			Sheep		
	Samples Tested	Samples Positive	Percent Positive	Samples Tested	Samples Positive	Percent Positive
<1	41	13	31.7[a]	18	12	66.7[a]
1-2	56	25	44.6[a]	28	11	39.3[a]
>2	42	16	38.1a	15	5	33.3[a]
Total	139	54	38.8a	61	28	45.9[a]

Values with same superscripts (within a species) indicate non-significant difference (P<0.05)

higher than goats of <1 year age group. The difference in other groups was non-significant (P<0.05).

The overall prevalence of PPR was non-significantly higher in males (42.5%) as compared to females (39.8%) (Table 2).

in organized farms (Table 3).

The samples of unorganized herds showed higher prevalence as are seasonal by migratory which predisposed them to infection. This fact was further established by outbreaks of PPR in migratory herds (Joshi *et al.,* 1996 and Singh *et al.,* 1996).

Table 2: Sex wise seroprevalence of PPR in goats and sheep

Species	Male			Female		
	Samples Tested	Samples Positive	Percent Positive	Samples Tested	Samples Positive	Percent Positive
Goat	62	24	38.9[3]	77	30	38.9[a]
Sheep	25	13	*52.0*[s]	36	15	41.7[a]
Total	87	37	42.5[s]	113	45	39.8[a]

Values with same superscripts (within a species) indicate non-significant difference (P<0.05)

The overall seroprevalence of PPR was higher in unorganized farms (42.7%) as compared to organized farms (34.1%), the difference however was non-significant statistically. In goats, it was 40.1% in unorganized farms and 31.8% in organized farms. In sheep, it was 50.0% in unorganized farms and 36.8%

The seroprevalence of PPR in goats was highest in Jammu (46.0%) followed by Udhampur (40.0%), Kathua (31.8%) and Samba (29.4%). In sheep, it was highest in Kathua (55.6%) followed by Udhampur (47.7%) and Samba (25.0%) (Table 4). The possible reason *could* be due to the fact that the samples

Table 3: Seroprevalence of PPR in organized and unorganized farms

Species	Organized			Unorganized		
	Samples Tested	Samples Positive	Percent Positive	Samples Tested	Samples Positive	Percent Positive
Goat	22	7	31.8[3]	117	47	40.1[a]
Sheep	19	7	36.8[8]	42	21	50.0[a]
Total	41	14	34.1[s1]	159	68	42.7[a]

Values with same superscripts (within a species) indicate non-significant difference (P<0.05)

Table 4: District wise seroprevalence of PPR in Jammu region

Species / District	Goat			Sheep		
	Samples tested	Samples positive	Percent Positive	Samples tested	Samples positive	Percent Positive
Jammu	63	29	46.0	-	-	-
Udhampur	20	8	40.0	44	21	47.7
Kathua	22	7	31.8	9	5	55.6
Samba	34	10	29.4	8	2	25.0
Total	139	54	38.8	61	28	45.9

of Miran Sahib (Jammu district) and Dayalachak (Kathua district) belonging to goat and sheep respectively were of the flocks owned by Gujjar which undergo seasonal migration. The greater animal movement leading to stress, worm burden and poor nutritional status might be important contributory factors for higher prevalence**.**

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Effect of bovine colostrum supplementation on body weight and biochemical parameters in rabbits

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Abstract

Rabbits (12) were utilized for the study under two groups of 6 each. The rabbits were supplemented daily with fresh first milking bovine colostrum @ 5 ml/kg b wt per os for 14 days. The biochemical parameters including liver and kidney function, serum IgG and weekly body weight gain (for 3 weeks) were observed. No significant change was noticed in any of the parameters except AST which decreased significantly on day 7 and 14 of the study. Body weight gain increased significantly as long as colostrum was supplemented. Based on these results, it can be concluded that the growing rabbits had no observed biochemical abnormalities caused by the colostrum at the level of supplementation used, hence can be effectively used as a natural growth promoter across the species.

Keywords: Biochemical changes, Colostrum, Rabbits, Nutraceutical

Bovine colostrum plays an important role in post-natal health as an immune booster across the species (Nagaraja, 2010). It contains various bioactive components such as immunoglobulins, antimicrobial proteins, growth factors and antioxidants (Kelly, 2003). The colostral components that convey its nutraceutical properties are nearly identical in structure and function among different species, paving way for its use across the species due to the relative ease with which large amount of it can be collected and processed (Taillon and Andreasen, 2000). No adverse effects following high quality colostrum supplementation have been reported in normal healthy subjects making it an exceptionally safe and useful nutraceutical product for use in a wide range of applications (Davis *et al.,* 2007).

Materials and Methods

Rabbits: The study was carried out in growing New Zealand White rabbits in the Medicine division of IVRI, Izatnagar, India. The rabbits were randomly divided in two groups of 6 each. They were housed individually in cages and maintained on standard ration throughout the study. The rabbits of the experimental group (group B) were given 5 ml of the freshly collected first milking bovine colostrum / kg b wt daily *per os* for 14 days. The rabbits of control group (group A) were given 5 ml of phosphate buffer daily *per os* for 14 days.

Colostrum collection: The fresh 1st milking colostrum was collected from cows and stored at -20°C in aliquots of 25 ml to avoid repeated freezing – thawing – refreezing of the colostrum.

Serum collection: Blood samples were collected from the rabbits on day 0 (before starting the experiment), 7 and 14th of the study, and serum was harvested. The serum samples were stored at -20°C until analysis. All the parameters were analyzed using standard protocols.

IgG quantitation: Serum IgG concentrations were estimated by single radial immunodiffusion test. Serum samples (5 µl) were inoculated in each well and plates were incubated at room temperature for 18 hours. Diameter of the observed zone of precipitation was recorded 18 hours after initiation of incubation. The serum IgG concentrations were determined by comparing diameter of the zone for unknown samples with those for standard curve generated by use of commercially available rabbit IgG standards.

Body weight gain: The individual body weights were taken on day 0, 7, 14 and 21st of the study and weekly gain in body weight was calculated to see the potential of bovine colostrum as a natural growth promoter in rabbits.

Statistical analysis: The data were analyzed using t-test to find out the significance of difference between the mean values of the groups (Snedecor and Cochran, 1994).

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Results and Discussion

The effect of colostrum supplementation on blood chemistry is summarized in Table 1. No significant (P< 0.05) effect was observed on biochemical parameters except AST which showed a significant (P< 0.05) decline after colostrum supplementation on day 7 and 14 of the study. This is in agreement with Davis *et al.* (2007). No significant (P< 0.05) change was observed in serum IgG values throughout the study. IgG being a macromolecule is not absorbed beyond the absorptive phase (24-48 hours after birth). This is in confirmation with Rooke and Bland (2002) and Nagaraja (2010). However, the bioactive factors present in the bovine colostrum may act as a non specific immunomodulator (Playford *et al.,* 2000).

The body weight gain showed a significant (P< 0.05) increase due to colostrum supplementation and could be attributed to presence of number of growth and maturation factors in the bovine colostrum such as somatomedins (IGF-1, IGF-2), somatotropin, fibroblast growth factor (FGF), transforming growth factor α and β (TGF- α, TGF-β), platelet derived growth factor (PDGF) and epidermal growth factor (EGF) in addition to its nutrient profile, immunological

Table 1: Alterations in biochemical parameters in response to colostrum supplementation

Parameters	Group	Days		
		0	7	14
BUN (mg/dl)	A	11.01±2.91	11.30±2.78	12.31±2.47
	B	11.96±1.60	9.00±0.42	12.14±2.60
Creatinine (mg/dl)	A	2.92±0.76	1.83±0.44	2.47±0.34
	B	2.46±0.15	2.74±0.28	2.84±0.52
Glucose (mg/dl)	A	99.05±2.12	96.98±3.44	95.50±3.67
	B	95.71±4.82	89.46±1.27	89.92±1.48
Albumin (g/dl)	A	4.42±0.17	3.83±0.21	4.27±0.21
	B	4.48±0.47	3.43±0.19	4.00±0.21
Total protein (g/dl)	A	6.05±0.54	5.92±0.53	6.72±0.91
	B	5.92±0.18	6.27±0.75	7.52±0.85
ALT (IU/L)	A	22.00±5.51	25.33±7.62	21.67±3.93
	B	26.00±6.66	22.33±3.84	25.00±1.53
AST (IU/L)	A	32.00±5.57	22.00±4.51	30.00±12.01
	B	34.33±6.01[a]	16.33±5.04[b]	12.33±1.45[b]
ALP (KA units)	A	5.36±1.06	4.24±0.49	5.13±0.77
	B	5.73±1.17	4.58±0.53	4.28±0.41
Cholesterol (mg/dl)	A	51.96±3.59	58.48±2.37	59.47±0.82
	B	45.51±1.06	53.15±2.79	57.89±3.42
HDL-cholesterol (mg/dl)	A	32.86±4.16	25.45±3.64	34.53±3.31
	B	33.19±0.93	28.94±3.97	31.04±5.25
Bilirubin (mg/dl)	A	0.99±0.32	0.66±0.13	0.52±0.08
	B	0.96±0.40	1.03±0.35	0.94±0.34
Triglycerides (mg/dl)	A	127.33±29.72	118.00±10.39	124.00±6.93
	B	128.33±33.38	132.67±9.26	140.00±2.31
Glycerol free TGs (mg/dl)	A	117.33±29.72	108.00±10.39	114.00±6.93
	B	118.33±33.38	122.67±9.26	130.00±2.31
IgG (mg/dl)	A	565.00±125.73	618.33±46.67	663.33±79.39
	B	663.33±79.39	708.33±91.67	710.00±45.00

Values a and b differ significantly (P<0.05)

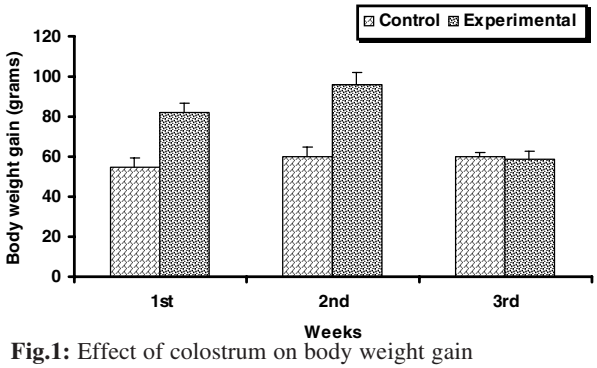

Fig.1: Effect of colostrum on body weight gain

factors and various enzymatic and non-enzymatic antioxidants which enhance the synthesis of DNA, RNA and proteins while at the same time inhibit breakdown of proteins (Ginjala and Pakkanen, 1998). Similar observations have been reported by King *et al.* (2001) and Le Huerou-Luron *et al.* (2004). However, Davis *et al.* (2007) and Boudry *et al.* (2008) reported no significant effect of bovine colostrum supplementation on weight gain.

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Short Communication

Rotavirus infection in calves, goat kids, lambs and piglets in Botswana

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Abstract

Rotavirus infection was detected using faecal samples from 218 dairy and 119 beef calves, 108 kids, 110 lambs and 97 piglets of < 3 months age. The prevalences was 39.4, 21.0, 14.8, 12.7 and 30.9% in dairy and beef calves, kids, lambs and piglets, respectively. Infection was significantly greater in animals managed under intensive or semi-intensive husbandry systems than those kept under extensive management. Higher infection rate (31.3%) was recorded in animals aging less than 4 weeks in comparison to those between > 4- 12 weeks (21.6%).

Keywords: : Calves, Kids, Lambs, Rotavirus infection

Rotaviruses are known to be a major cause of acute gastroenteritis in young animal and humans inflicting great economical losses due to high morbidity, mortality, treatment cost and reduced growth rate among infected animals. Since the virus is able to survive for extended periods in the environment, animal rotaviruses may cross the species barrier and infect children (Geyer *et al*., 2004). In Botswana, there are few reports on the prevalence of human rotavirus in children (Kasule *et al*., 2003; Kebaabetswe *et al*., 2005), but there seems to be no such information on animals. Hence there is need for surveillance of rotavirus infection in animals.

The investigation was conducted from October, 2009 to September, 2010 on 32 animal (13 dairy, 7 beef, 5 goat, 4 sheep and 3 piggery) farms located in southern Botswana. Faecal samples weighing 10-15 g were collected from 218 dairy and 119 beef calves, 108 kids, 110 lambs and 97 piglets < 3 months. Because of relatively small number of young animals at the selected farms, all the available animals were sampled. The consistency of each faecal sample was recorded. History revealed that all the dairy and piggery farms were managed under intensive and semi-intensive systems. In intensive system, there was zero grazing; whereas in semi-intensive, the animals were allowed to graze on pastures located in the premises of livestock farms. Extensive husbandary system was practiced at beef and small stock farms, where communal native pastures were used for grazing. Rotavirus antigen was detected in faecal suspensions by ELISA using a commercial RIDASCREEN• diagnostic kit (R-Biopharm, Darmstadt, Germany) and test procedure according to manufacturer's protocol. All sampled animals were also screened for the presence of *Cryptosporidium parvum* coproantigen by ELISA.

The present study reports the occurrence of rotavirus infection, for the first time in the region on all 32 farms sampled. The prevalences of infection were 39.4% (86/218), 21% (25/119), 14.8% (16/108), 12.7% (14/110) and 30.9% (30/97) in dairy and beef calves, kids, lambs and piglets, respectively. These findings are similar to the earlier studies (Kaminjolo and Adesiyan, 1994; Khafagi *et al*., 2010). Infection rate was significantly higher in dairy calves than beef calves (P<0.01). All of the 652 animals screened for *C. parvum* antigen demonstrated concurrent infection in 44 of 86 rotavirus infected dairy calves, 6 of 25 beef calves, 4 of 16 kids, 5 of 14 lambs and 3 of 30 piglets. Mixed infections with *Cryptosporidium*, *Escherichia coli*, coronavirus and *Salmonella* in young animals have been reported by Radostits *et al*. (2007). Higher infection rate (31.3% ± 2.6, 97 out of 310) was recorded in animals aging less than 4 weeks in comparison to those between > 4- 12 weeks (21.6% ± 2.6, 74 out of 310) and the differences were significant (P <0.01).

Rotavirus infection rates in animals reared under three husbandry systems were 34.5% (57/165) in intensive, 31% (74/238) in semi-intensive, and 16% (40/249) in extensive management conditions. Magnitude of infection was significantly greater in animals managed under intensive or semi-intensive husbandry systems than those kept under extensive management (P < 0.01). This was evidenced from increased infection rates in dairy calves and piglets that were reared under intensive or semi-intensive

managements and this supports the observations of Steele *et al*. (2004). Low prevalence of 16% obtained for animals kept in traditional extensive system in present study could not be compared as it seems to be the first report on rotavirus infection in traditionally reared animals in Africa. Diarrhoeic animals demonstrated 30.9% (83/269) infection in comparison to 23% (88/383) in apparently healthy animals and the differences were significant (P< 0.05).

It would be difficult to say whether animals with solid faeces were actually asymptomatic or had diarrhoea prior to sampling and recovering from rotavirus infection. The relatively high prevalences of rotavirus infection in calves, lambs, kids and piglets tested, coupled with increased infection rates in diarrhoeic animals as reported by Radostits *et al*. (2007) also point out that rotaviruses play an important role in producing neonatal diarrhoea and the infected livestock are potential sources of rotavirus infection in Botswana. Rotavirus antigen detection in animal faecal samples by ELISA proved to be fairly rapid, simple and sensitive. However, the high cost of the kits has hampered their frequent use in the diagnostic laboratories and research on rotaviruses in developing countries. Taking into consideration dearth of scientific information on the prevalence of rotaviruses in domesticated animals and the close proximity between herdsmen and their livestock in the African continent, more surveillance studies need to be conducted. Rotavirus infection was found associated with neonatal diarrhoea in approximately 31% animals and in view of possibilities of animal rotaviruses crossing species barrier, animals may be important reservoirs of infection among children.

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Haemato-biochemical changes in dogs affected with transmissible venereal tumour

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Abstract

Total 10 dogs (6 females and 4 males) suffering from transmissible venereal tumour were treated with vincristine sulphate @ 0.025 mg/kg b wt iv at weekly intervals thrice or four times. There was increase in Hb, PCV, AST, ALT and alkaline phosphatase and decrease in glucose values on day 7 and 14 but these changes were transient and returned to normal physiological limits after completion of therapy.

Keywords: Chemotherapy, Dog, Transmissible venereal tumour

Transmissible venereal tumours are mainly confined to the mucus membrane of the external genitalia of dogs of both sexes and can be found in adjacent to skin, brain, oral, nasal and conjunctival mucosa and inguinal lymph nodes (Ferriera *et al.,* 2000). Vincristine sulphate is usually given for its management. The present paper reports haematological and biochemical changes in dogs receiving vincristine sulphate.

Total 10 dogs (6 females, 4 males) weighing 12-18 kg were reported with the history of serosanguineous discharge from external genitalia. All the cases were confirmed as of transmissible venereal tumours treated with vincristine sulphate (Cytocristine®,Cipla) @ 0.025 mg/kg b wt iv through normal saline solution at weekly interval. Three treatments in 8 dogs and four treatments in 2 dogs were required for complete regression.

The blood samples were collected on day 0, 7 , 14 and 21 for estimation of Hb, PCV, TEC, TLC and DLC as per method by Jain (1986) and total protein, glucose, serum urea nitrogen, serum creatinine, AST, ALT and alkaline phosphatase by Erba autoanalyser using Erba diagnostic kits. The data were statistically analyzed (Snedecor and Cochran, 1994).

The mean age of dogs suffering from transmissible venereal tumour was 4.3 yrs (with a range of 1-10 yrs) as recorded by Brown *et al.* (1980). The duration of symptoms/illness was 69 days (45-100 days) as against 125 days reported by Calvert *et al.* (1982).The mean number of treatments was 3.2 (3-4) which corroborate with the findings of Calvert *et al.* (1982).The occurrence was more in females as compared to males. Metastasis could not be detected in any of the dogs as revealed by radiographic examination of lungs.

By 3 treatments in 8 dogs and 4 treatments in 2 dogs, regression was achieved with no visible scars or tumour masses on the penis and prepuce in males and on mucosa of vulva/vagina in females. Tella *et al.* (2004) reported complete regression in 4 weeks after administration of vincristine sulphate. One treated dog exhibited mild side effects like anorexia, vomiting, diarrhoea and neutropenia (Tella *et al.,* 2004). However, Calvert *et al.* (1982) reported side effects in 13% dogs receiving vincristine sulphate therapy.

There was significant increase in PCV and Hb and decrease in glucose levels after two successive treatments (Table 1). However, the values of TLC, DLC, BUN, creatinine and total protein did not change significantly following treatment. The slight and transient normocytic normochromic anaemia and leukopenia have been reported by Tella *et al.* (2004) in dogs after vincristine sulphate treatment. The activities of AST, ALT and alkaline phosphatase enzymes were elevated on day 14 however the values were decrease afterwards and remained within normal physiological limits on day-21(Table.1).

The earlier endeavors in this regard based on combination chemotherapies using vincristine, cyclophosphamide and methotrexate (Brown *et al.,* 1980) were not as successful, probably because of the higher dosage and toxic effects of these anti-mitotic drugs (Price *et al.,* 1991) on the myocardium, intestines and bone marrow, all organs with very high cellular turn over rate. Moreover, this combination over

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Table 1 : Haemato-biochemical changes at different intervals after treatment with vincristine sulphate in dogs (Mean ± SE)

Parameters	Periods of observation (in days)			
	0	7	14	21
Hb (g %)	12.64±0.49[a]	13.99±0.42[b]	14.80±0.49[c]	15.46±0.43[c]
PCV (%)	38.58±1.43[a]	43.13±1.15[b]	45.26±1.25[b]	49.50±1.18[c]
Glucose(mg/dl)	48.77±1.91[a]	42.42±1.42[b]	39.52±1.55[b]	41.65±1.76[b]
SGOT(U/L)	28.92±1.72[a]	31.53±1.92[a]	51.96±3.21[b]	29.90±1.39[ac]
SGPT(U/L)	26.62±1.41[a]	21.51±1.15[a]	51.12±1.58[b]	50.68±1.58[b]
Alkaline phosphatase(U/L)	46.42±0.55[a]	48.01±0.90[a]	49.98±1.04[b]	47.70±0.84[a]

Values bearing similar alphabet as superscript at respective intervals did not differ significantly (P>0.05)

protracted period poses economic tasking for most of the dog owners. In the present study untoward effects of vincristine sulphate was well tolerated by the dogs because of the low doses and well spaced short duration of therapy and moreover, the haemato-biochemical changes were transient and returned to normal physiological limits after stoppage of vincristine sulphate administration.

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Trace mineral concentration in blood of cattle reared in Ranchi district of Jharkhand

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Abstract

Total 100 cattle maintained in different areas around Ranchi were divided into four age groups, viz. Gr-I (0-6 months), Gr- II (6-12 months), Gr-III (1-2 years) and Gr -IV (above 2 years) of 25 animals each. The blood samples were collected for Cu, Fe, Mn and Zn estimation. A significant effect of age on micronutrients was noticed with highest values for Cu (1.39 ± 0.63 ppm) and Zn (1.40 ± 0.02 ppm) in 1-2 years age group and Fe (3.31 ± 0.03 ppm) in above 2 years age group.

Keywords: Trace mineral, Cattle, Ranchi

Trace minerals are essential for various life processes, viz. growth, maintenance, reproduction and functioning of the body tissues in animals. Deficiency of these micronutrients may lead to development of varied syndromes. The present investigation was therefore, undertaken to know the age wise deficiency of these micronutrients and therapy with providing these micronutrients in proper concentration in mineral mixture.

Total 100 cattle maintained in different areas around Ranchi along with Ranchi Veterinary College and Ranchi Agriculture College (Bihar Agriculture University) dairy farm were divided into four age groups, viz. Gr-I (0-6 months), Gr-II (6-12 months), Gr-III (1-2 years) and Gr-IV (above 2 years) containing 25 animals each. The blood samples were collected for Cu, Fe, Mn and Zn analysis using Atomic Absorption Spectrophotometer (model GBC 902). The analysis of data was done as per method described by Snedecor and Cochran (1968).

On the basis of status of Cu, Zn, Fe and Mn, the animals were given mineral supplementation.

The mean levels of various micronutrients observed in present study are comparable to those reported earlier for Cu (Sharma *et al.*, 1999), Fe (Das *et al.,* 1997), Zn (Das *et al.,* 1997) and Mn (Prasad and Rao, 1997).

A significant effect of age was seen on serum Cu, Fe and Zn (Table 1). Further critical difference test revealed progressive increase in these micronutrients with the advancement of age. The higher level of Fe in the above 2 years old animals might be due to high demand for lactation and gestation. Gowda *et al.* (2000) opined that mineral status in animals depends on the physiological stages. The lowest level of iron observed during the earlier age might be due to low intake of iron as these animals primarily depend upon mother's milk which is poor source of Fe. (Petel *et al.,* 1965).

Table 1: Level of Cu, Fe, Zn and Mn concentration (mean ± S.E.) in cross-bred cattle of different age groups.

Age group (Month)	Cu (ppm)	Fe (ppm)	Zn (ppm)	Mn (ppm)
0-6	1.07 ± 0.04[a]	2.16 ± 0.15[a]	1.08 ± 0.04[a]	0.23 ± 0.02
6-12	1.28 ± 0.03[b]	2.58 ± 0.16[b]	1.26 ± 0.04[b]	0.30 ± 0.04
12-24	1.39 ± 0.63[c]	3.06 ± 0.12[c]	1.40 ± 0.02[c]	0.25 ± 0.02
24 onwards	1.35 ± 0.03b[c]	3.31 ± 0.03[c]	1.33 ± 0.03b[c]	0.27 ± 0.02

Means under the same superscript did not differ significantly in a row.

Lower and highest Zn level was in accordance with the findings of Singh *et al.* (1997). The low level of Mn in comparison to recommendation made by Blood *et al.* (1983) might be due to insufficient Mn

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content in the grazing plants.

The mineral mixture available in the local market are consisting mostly 0.36%, 1.22%, 0.36% and 0.52% of Cu, Fe, Zn and Mn, respectively and are usually fed @ 30 to 40 gm per cow/day. It does not meet the requirement. On the basis of the present study, 118 mg area specific mineral mixture consisting of Cu-8 mg, Fe-40 mg, Zn-30 mg and Mn-40 mg was prepared and fed to the animals per kg of ration daily for one month. It improved the health of animals.

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Comparative evaluation of Johnin intradermal test and Gamma interferon assay in bovine paratuberculosis

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Abstract

Thirty seven animals from an endemic area of paratuberculosis were used to find the diagnostic sensitivity and specificity of Johnin intradermal test and gamma interferon assay. The diagnostic sensitivity and specificity of Johnin intra dermal test over gamma interferon assay was 38.09 % and 93.75 %, respectively.

Key words: Bovine, Diagnosis, Johnin Test, Paratuberculosis

Paratuberculosis in cattle is a chronic and progressive infection caused by *Mycobacterium avium* subsp. *paratuberculosis* (MAP). It is important to differentiate between conditions such as the infectious, infected and non-infected as infectious animals are an immediate risk for spread of MAP, whereas the infected animal constitutes a future risk of spread. Detection of non-infected animals is of particular importance in certification schemes (Nielsen, 2008).The present paper evaluates two tests in detection of MAP.

37 animals aged over 2 yr in paratuberculosis endemic area (26 crossbred cattle and 11 graded Murrah) were selected for diagnostic evaluation of gamma interferon assay and Johnin single intra dermal test.

The single intradermal (SID) test was performed in the cervical area as described by OIE (2008) while for gamma interferon enzyme linked immunosorbent assay, BOVIGAM kit (Biocor animal health Inc., USA) was employed and the results were interpreted as positive and negative if the difference between the antigen stimulated plasma OD and the nil antigen control OD was de 0.1 and ee 0.1, respectively.

Only 21 (11 crossbred cattle and 10 graded Murrah) were positive by gamma interference (γ- IFN) and 9 were positive by SID. The diagnostic Sensitivity and Specificity of SID over γ- IFN was 88.88% and 53.57%, respectively. The concordance between these two tests was 62.12. Kappa statistics were used to find the agreement between these two tests revealed value of 29.81 indicating that there was a fair agreement (Table 1).

Single intradermal Johnin test was most popular and reasonably accurate although not sufficiently enough to be a dependable diagnostic method in individual animals because of the poor sensitivity. The test in the cervical area was more sensitive than the caudal fold which also suffers from its lack of availability if further tests were to be performed (Radostits *et al.,* 2007). Kallis *et al* (2003) found that in paratuberculosis-free herds, there was a low agreement between skin test and γ- IFN assay results *($\hat{e}$ = 0.29)* while in low prevalence herds the level of agreement was higher *($\hat{e}$ = 0.40)*. But in this study, the endemic herd showed a low agreement between these two tests ($\hat{e}$ = 0.29).

The sensitivity and specificity of SID over γ- IFN assay in infected paratuberculosis herd differ from the observation of (Kallis *et al*, 2003). In our study the sensitivity and specificity was 38.09 % and 93.75 % respectively, probably due to the Johnin PPD used. Kallis *et al* (2003) indicated that difference in PPD antigens influenced SID and IFN - γ assay specificity and sensitivity.

Culling of CMI test-positives could be a cost-effective means of removing infected animals before they actually start faecal shedding. Positive skin test results with γ- IFN assay have been observed to have a high correlation when employed together. This observation has therefore been the basis of the study where in γ-IFN assay could effectively be combined with skin test and improves skin test specificity in the diagnosis of tuberculosis in cattle and humans (Whipple *et al.*, 2001; Pottumarthy *et al.*, 1999).

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Table 1: Diagnostic evaluation of single intradermal test over gamma interferon assay

γ- IFN testSID test	γ- IFN positive	γ- IFN Negative
SID Positive	8	1
SID negative	13	15

(Sensitivity – 38.09%; Specificity – 93.75 %; Concordance - 62.12; Kappa statistics – 29.81)

The low cost and ease of application of the skin test, and the possibility of confirmation offered by the γ- IFN assay are other arguments in favour of using CMI tests for diagnosis and control of paratuberculosis (Kallis *et al.,* 2003). For paratuberculosis diagnosis, the Johnin skin test can be used with greater sensitivity if the animals are interpreted as positive when skin thickness increased ee4 mm, is a specific and low-cost test for the early diagnosis of paratuberculosis in a majority of dairy herds.

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Haemato-biochemical changes in experimentally induced ancylostomiasis in dogs

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Abstract

Ancylostomiasis was induced in 6 mongrel pups by feeding 800 actively motile infective larvae and blood was collected on day 0,7,14,21 and 28 post infection for haematobiochemical analysis. Significant reduction in TEC, Hb and PCV and increase in TLC were observed on day 14, 21 and 28. Neutrophil and eosinophil counts were also elevated on day 21 and 7, respectively. Significant reduction in total protein and serum iron levels and gradual reduction of albumin & globulin were also observed.

Keywords: Ancylostomiasis, Biochemical changes, Dog, Haematology.

Ancylostoma caninum larvae can be viable for an indefinite period in the contaminated soil and water and the dogs are easily exposed to infection during their free movement and feeding in open environment. Ancylostomiasis is of zoonotic importance as cutaneous larval migrans, chronic eosinophilic enteritis and irritable bowel syndrome have been reported from human beings. The present paper reports haematobiochemical changes in pups infected with ancylostomiasis.

The faecal samples of pups positive for *A. caninum* were cultured under humidified condition and sufficient aeration for larval development (Soulsby, 1982). Total 6 mongrel pups of 5-6 months of age and 10-12 Kg. b wt were fed with 800 actively motile infective larvae. The animals were kept in properly cleaned and disinfected kennel and provided with standard diet. Periodical coprological examination of the pups was conducted for confirmation of establishment of infection. Blood was collected from each pup on day 0,7,14,21 and 28 post infection and subsequently subjected to standard haematological (Schalm *et al.*, 1975) and serum biochemical analysis using commercially available kits (Span diagnostics).

There was significant reduction in TEC, Hb and PCV values on day 7, 14, 21 and 28 post infection

Table 1. Haematobiochemical changes (Mean±S.E.) in experimentally infected ancylostomiasis in dogs.

Parameters	Pre-infection(0 day)	Post-infection			
		7th day	14th day	21st day	28th day
Hemoglobin (g/dl)	12.53± 0.201 ^{a}	12.30± 0.182 ^{a}	8.15± 0.159 ^{b}	7.73± 0.209 ^{b}	6.78± 0.244 ^{c}
TEC(x10^{6}/cu.mm)	5.90± 0.097 ^{a}	5.63± 0.085 ^{a}	4.67± 0.105 ^{b}	4.10± 0.058 ^{c}	3.73± 0.067 ^{d}
PCV(%)	39.67± 0.558 ^{a}	36.50± 0.922 ^{a}	29.83± 0.601 ^{b}	25.67± 0.803 ^{c}	20.67± 0.955 ^{d}
Reticulocyte (%)	0.54 ± 0.115 ^{a}	0.56± 0.077 ^{a}	0.77± 0.083 ^{a}	1.99± 0.180 ^{b}	3.12± 0.137 ^{c}
TLC(x 10^{3}/cu.mm)	8. 02± 0.101^{a}	8. 83± 0.154 ^{b}	9.32± 0.135 ^{bc}	9. 62± 0.145 ^{cd}	9. 90± 0.058 ^{d}
Neutrophil %	60. 67± 1.406 ^{ab}	60. 17± 0.872 ^{a}	62. 83± 0.703 ^{ab}	64. 33± 0.494 ^{bc}	67. 83± 0.792 ^{c}
Lymphocyte%	30 .80± 0.583 ^{a}	24 .83± 1.078 ^{b}	22. 66± 0.494 ^{bc}	20. 67 ± 0.333 ^{c}	17. 33± 0.882 ^{d}
Monocyte%	3.80± 0.583	4.00 ± 0.577	3.00 ± 0.365	2.83± 0.307	2.67± 0.333
Eosinophil%	6.00± 0.548 ^{a}	11.16± 0.601 ^{b}	11.50± 0.342 ^{b}	12.17± 0.307 ^{b}	12.33± 0.333 ^{b}
Protein (gm/dl)	6.62± 0.260 ^{a}	6.35± 0.199 ^{a}	5.56± 0.167 ^{b}	4.95± 0.085 ^{b}	4.13± 0.084 ^{c}
Albumin (gm/dl)	3.10± 0.089 ^{a}	2.87± 0.088 ^{ab}	2.68± 0.061 ^{bc}	2.35± 0.067 ^{c}	1.87± 0.092 ^{d}
Globulin (gm/dl)	3.52± 0.320 ^{a}	3.48± 0.236 ^{a}	2.88 ± 0.158 ^{ab}	2.60± 0.082 ^{b}	2.27± 0.133 ^{b}
A:G ratio	0.92± 0.121	0.84± 0.072	0.77± 0.146	0.90± 0.048	0.84± 0.088
Glucose(mg/dl)	83.60± 1.939 ^{a}	78.50± 0.764 ^{ab}	74.67± 1.116 ^{bc}	70.17± 0.703 ^{c}	63.00± 1.693 ^{d}
Serum Iron(µg/dl)	104.26± 1.257 ^{a}	101.93± 0.628 ^{a}	93.28± 0.827 ^{b}	86.37± 0.782 ^{c}	79.70± 0.392 ^{d}
Serum Copper(µg/dl)	103.77± 1.085	103.02± 1.050	102.35± 0.724	102.42± 0.657	103.02± 1.104

Different Superscripts (a,b,c,d) denotes there is significant difference between the treatments at 1% ($p < 0.01$)

when compared to 0 day (Table 1). Reduction in the erythrocytic index could be ascribed due to blood sucking habit of the adult parasites in the intestine as well as the poor iron reserve of the pups. Concomitant increase in the reticulocyte percentage on day 21 and 28 (Table 1) indicated development of regenerative anaemia with simultaneous stimulation of bone marrow for accelerated erythropoiesis. Poongodi *et al.* (2004) reported similar changes.

Significant increase in TLC on days 14, 21 and 28 and neutrophil and eosinophil counts on day 21 and 7, respectively were recorded (Table 1). The eosinophilic and neutrophilic response could be ascribed to pro-inflammatory process and tissue injuries triggered following the larval migration and subsequent release of histamine or serotonine like chemoattractants (Chatterjee, 1993). Significant decrease in lymphocyte count on day 7 onwards could be ascribed to impending systemic stress and immunosuppression following infection (Chatterjee, 1993).

Reduction in total protein and gradual reduction in albumin and globulin were noticed from 7th day onwards (Table 1). Reduction in total protein could be due to blood sucking habit of parasites and impaired absorption of nutrients from intestine. Similar findings were also shared by Chatterjee (1993) and Brar and Nauriyal (1993). Glucose level was significantly decreased which is possibly due to high glucose intake by the adult parasites as reported also.

Concentration of serum iron was also decreased significantly (Table 1) as observed by Srinivasa Rao *et al.* (1999) also. It is probably due to chronic intestinal haemorrhages and blood intake by the adult parasites.

It is concluded that ancylostomiasis in dogs causes regenerative anaemia, eosinophilia and hypoproteinemia which are life threatening if immediate therapeutic intervention is not taken.

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Health and management practices in commercial dairy farms

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Abstract

The commercial dairy farms in urban, peri urban and rural areas of Bareilly district of U.P. were studied. It was observed that the commercial dairy farming in urban and peri urban areas is a highly commercialized and profit oriented business as compared to their rural counterparts due to easy availability of veterinary services, market and good remunerative prices for the milk.

Keywords: : Calf mortality, Dairy management, Milk management

In our country the livestock farming is still practiced as a subsidiary occupation next to crops. The number of commercial dairy farms in the peri urban and urban areas of the metros and big cities is increasing. These dairies house 2-100 milch animals and mainly fulfill the milk needs of the urban population. The present study was designed to make a detailed investigation of such dairy farms and to delineate the strength and weakness of such farms so as to draw concrete suggestions to improve the milk production and productivity of dairy farms.

Case study method was used to study three different commercial dairy farms i.e., rural (existing in the villages situated more than 20 kms from town), peri urban (within 10 kms from town) and urban (within the periphery of urban area) dairy farms. Each of this dairy farm was studied in detail with respect to all the gamuts of livestock production viz., breeding, feeding, management, health care and marketing aspects. The critical differences between these farms with respect to the various parameters under the study were analysed.

The rural dairy owner had non descript animals with low milk yield while those in the urban and peri urban areas were having high yielding animals (5-12 numbers and mostly Murrah or improved buffaloes) and the major reason is high demand and cost of milk in urban areas and easy marketing of milk. But the low number of calves in the peri urban and urban dairies (only one calf in the farms studied) reveal the poor quality of calf management in these farms while in the rural dairies there were more calves (four calves). The herd structure further revealed that the commercial dairy owner in the urban and the peri urban area only kept the milch animals and gave away the heifers on contract and the dry animals either on contract or sold them to the butchers. Further the rural dairy owner had devoted a small piece of land for fodder (Berseem and Lahta) cultivation which was not done by the urban dairy owners. Similar findings were reported in rapid rural appraisal in dairy sector (Raj kumar , 1993)

The expenditure on feeding is one of the most important parameters to be considered in the commercial dairy farms. The peri urban and urban dairy owners did not feed green fodder to their milch animals because of its non availability in the urban areas, but they fed good amount of concentrate (@ 4-5 kg / animal/ day) to their animals. The rural dairy owner had spared ½ acre land for green fodder and fed to animals regularly with wheat bran or Daliya @ 500 g/animal / day. Salt feeding was done by the rural and the urban dairy owners (@ 30 g/ animal/day) whereas it was not practiced in the peri urban dairy farm. None of the dairy owners fed any mineral mixture to their animals as they felt it was not profitable. Further none of them knew about the urea treatment of straw to increase its nutritive quality.

In peri urban and urban dairy, calves were allowed to suckle before milking for milk let down and then were left after milking the animals. While in rural area, one teat full milk for the calf was given. It was observed that timely feeding of colostrum to young animals is not practiced in most of dairies, which was also experienced by others (Varma 1994, Singh *et al.*, 2003, Tiwari *et al.,* 2003). It needs the attention of professional to improve the knowledge of farmers about timely colostrum feeding.

It was also found that these commercial dairy

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owners are not interested in rearing the calves and heifers. These commercial farms want to get maximum milk production from the animals and are using the calves only to stimulate milk let down and not for providing the milk to them. Production per animal (3-4 liters peak milk yield of cow and 5-6 litres peak milk yield of buffalo) as well as the total production (8 lit / day in the farm) was very low in the rural dairy farms, while it was high in the peri urban and the urban dairies (12 lit peak milk yield of cow and 10-15 lit peak milk yield of buffalo and total production 40 lit / day in the farm) . The peri urban and the urban dairy owner received good remunerative price for their milk (Rs. 15- 18 / lit) while the rural dairy owner got less price (Rs. 10 /lit) which may be due to the fact that the rural owner sold the milk to the middleman while the peri urban and the urban dairy owners sold their milk directly to the consumers.

There was a better management of dairy farm in the rural and peri urban area as compared to the urban dairy. Overcrowding and lack of cleanliness were the major problem in the urban dairy, while the rural dairy was comparatively clean. All the three types of dairy owners regularly vaccinated their animals against HS and FMD.

Proper health care of milch animals and young animals is very essential to reduce direct economic losses due to mortality (Acharya , 1991) , In this study it was found that farmers were very vigilant for timely vaccination of important infectious diseases , all three types of dairy owners regularly vaccinated their animals against H S and FMD.

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Epidemiological investigation of goat pox in West Bengal

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Abstract

Epidemiological study of goat pox in 3 districts of West Bengal revealed that the disease varied between 4-6 weeks. It caused more morbidity, mortality and case fatality rates in kids. There was no much seasonal variation but the occurrence and severity was high in summer season.

Keywords: Epidemiology, Goat Pox, West Bengal.

Goat pox affects goats of all ages, sex and breeds but the disease is more common and severe in younger than older animals and lactating females. It is prevalent throughout South Western Asia, the Indian sub-continent, North and Central Africa. The present paper reports effect of season, age and sex on the morbidity, mortality and case fatality rates of goat pox.

The study was conducted in Jatirampur and Pathar Pratima villages of South 24 Parganas District and Doluipur Village of Nadia District by door to door pilot survey examining 1278 goats in 314 households. Detailed history in relation to age, sex, season, total number of goats, number of affected goats and number of death was collected during the survey and data were analyzed statistically. The calendar year was divided into three seasons, i.e. summer (March to June), rainy (July to October) and winter (November to February). Age group wise, animals up to 6 months age were put as kids and above 6 months as adults. The results were analyzed using Z-Statistics (Decision Analyst, Inc. Version 1.1, STATS Software, 98).

Out of 1278 goats, 974 were affected and 781 died due to goat pox. Overall morbidity, mortality and case fatality rates were 76.21, 61.11 and 80.18 % respectively. More of less similar findings were reported by Saha *et al.* (1985). Out of 575 males and 703 females, 421 males and 553 females were affected and 320 males and 461 females died indicating morbidity, mortality and case fatality rates as 73.21, 55.65, and 76.01 %, respectively in males and 78.66, 65.57, and 83.36 %, respectively in females. The morbidity, mortality and case fatality rates were significantly higher in female than male. Das and Pradhan (2006) found the ratio of morbidity and mortality between male and female as 1:1.34 and 1:1.55 indicating higher rates in female goats.

The morbidity, mortality and case fatality rates were highest in summer season i.e. 80.69, 70.17 and 86.96 %, respectively followed by winter i.e. 74.59, 56.81 and 76.16 %, respectively and rainy seasons i.e. 71.11, 52.17 and 73.36 %, respectively. Dutta *et al.* (1983) also reported higher incidences of the disease during summer season.

Morbidity, mortality and case fatality rates were 82.47, 74.57 and 90.42 % in kids and 73.31, 54.87 and 74.84 % in adults, respectively. These rates were significantly higher in kids. Sadhukhan *et al.* (1998) also observed higher morbidity and mortality rates in animals below 12 months of age. Saha *et al.* (1985) reported 100 % death rate in kids up to the age of 3 months.

Kids suffer more due to low resistance as a result of weaning of maternal antibody. In adults, the immune system is more developed or they might have experienced mild infection earlier leading to development of mild resistance to the infection and therefore, decreased in severity of infection.

In summer season, goats are exposed to extreme hot environmental temperature causing suppression of immune system due to stress and predisposing the goats to infection. In summer season, scabs become dry due to environmental temperature and at the same time wind flow is more in Sundarban region which facilitates the carrying of virus in dried scabs in air resulting in rapid dissemination of the disease in susceptible population (Bhanuprakash *et al.,*

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Therapeutic management of ketosis in bovine

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Abstract

The present investigation has undertaken to compare the efficacy of different therapeutic regimen in 40 ketotic cows. All the 40 ketotic animals equally divided into gr T_1, T_2, T_3 and T_4 received 1 liter of 25% glucose iv followed by 500 ml iv once daily for next 2 days. Vit B Complex (B_1, B_6 and B_{12}) was added in gr T_2, T_3 and T_4 @ 10 ml daily with drip. In gr T_3 nandrolone (50 mg im as single dose) and in gr T_4 dexamethasone (5 ml im as single dose) were also given. The mean recovery time (days) was recorded highest in gr T_4 (1.7±0.26) followed by T_3 (2.1±0.23), T_2 (2.6±0.16) and T_1 (3.3±0.26). Frequency of relapse was highest in gr. T_1 (40%) in comparison to gr. T_2 (5%), T_3 (5%) and T_4 (5%). Therefore, hormonal therapy with dexamethasone or nandrolone in association parenteral glucose and B-complex (B_1, B_2 and B_3) gave excellent recovery rate and very less evidence of relapse.

Keywords: : Cow, Ketone bodies, Ketosis, Treatment

High incidence of clinical and subclinical ketosis causes economic loss to the dairy farmers due to loss of milk production as well as sharp drop in the SNF content of milk and failure of affected animals to return to normal production after recovery (Radostits *et al.*, 2000). Present paper reports comparative efficacy of different therapeutic regimen in the management of ketosis in crossbred cows at different stages of lactation.

Total 40 crossbred cows of 3-14 years age brought to Clinical Complex with the complaint of inappetence, pica and sudden fall in milk production (25-75%) were used. They were in different lactation numbers (1-7th), parturated 15-120 days back and suspected to be suffering from ketosis. The milk and urine samples tested positive for ketone bodies. Blood glucose was estimated before and after therapy by standard method. These cows were randomly divided into four equal groups. Animals of all the groups received 1 liter of dextrose (25%) iv followed by 500 ml iv once daily for next 2 days. Vit B Complex (B_1, B_6 and B_{12}) was added in gr T_2, T_3 and T_4 @ 10 ml daily with drip. In gr T_3 nandrolone (50 mg im as single dose) and in gr T_4 dexamethasone (5 ml im as single dose) were also given. The efficacy of therapeutic regimens was evaluated on the basis of clinical response, time required for complete recovery, percent recovery and post-treatment blood glucose values.

Urine and milk samples of 20 (50%) animals showed highly positive (+++), 10 (25%) showed moderately positive (++) and remaining 10 (25%) did not show any reaction with Rothera's test. Blood glucose levels were 31.37±1.34, 29.23±3.21, 30.11±1.54 and 28.87±0.85 mg/dl in gr T_1, T_2, T_3 and T_4 respectively and were comparatively low (Radostits *et al.*, 2000). Clinical examination revealed almost normal rectal temperature (101-103 ^{0}F), slightly elevated pulse (60-80/min) and respiratory (30-40/min) rates and reduced ruminal movements (1-3/min). A characteristic sweetish odour was also detected in the breath, milk and urine in most of the cases (Swain and Tripathy, 1987). Besides, 4 (10%) cows were showing wasting form of the disease and another 4 (10%) cows were showed nervous symptoms like head and nose pressing and vigorous licking of their own skin and mangers as well.

The low level of blood glucose in all the four groups could be attributed to the negative energy balance reflecting greater demand of glucose in the mammary gland (Anantwar and Singh, 1993). Hypocalcaemia can exert an additional depressive effect on endogenous glucose production; hence aggravate hypoglycaemia (Mandali *et al.*, 2002; Schlumbolim and Harmeyer, 2003). In ruminants glucose is synthesized from propionic acid and fulfills the requirement of glucose.

Animals of gr T_1 receiving only parenteral glucose recovered 100 percent within 3.3±0.26 days. However, only three animals (30%) recovered after single therapy, whereas two animals (20%) required second dose and rest five animals (50%) recovered completely after third dose as evident by subsequent disappearance of clinical signs and gradual increase of milk production. Poor response in group T_1 could be due to glucose therapy alone could not maintain

Table1. Comparative efficacy of different treatment for the treatment of bovine ketosis

S.No.	Observations	gr T_1	gr T_2	grT_3	gr T_4
1.	Mean blood glucose level before treatment	31.37±1.34	29.23±3.21	30.11±1.54	28.87±0.85
2.	Mean blood glucose level after treatment	42.62±4.31	44.53±2.31	48.53±2.16	50.45±1.28
3.	Percentage recovery (%)	100	100	100	100
4.	Mean recovery time (days)	3.3±0.26	2.6±0.16	2.1±0.23	1.7±0.26
5.	Frequency of relapse (%)	40	5	5	5
6.	Recovery by single therapy (%)	30	60	75	80

consistent blood glucose level and failed to restabilize disturbed body metabolism in ketotic animals (Mir and Malik, 2003). Higher recovery rate in gr T_2 animals could be due to an additional treatment with B-complex. Animals of group T_3 given additional treatment with anabolic steroid (Nandrolone) showed very good response as compared to gr T_1 and T_2 which might be due to the faster elimination of ketone bodies from the blood 24-48 hr of treatment (Dhoble *et al.,* 2007). Recovery in group T_4 animals was earliest compared to the rest groups (Table 1) could be due to additional glucocorticoid (dexamethasone) therapy which increases blood glucose level within 24 hr by increasing the availability of gluconeogenic amino acids from increased protein mobilization (Odedra *et al.,* 1980). In addition, glucocorticoids accompanied by temporarily depression in milk yield, which may contribute to the recovery rate (Radostits *et al.,* 2000).

From this study, it can be concluded that hormonal therapy with dexamethasone or nandrolone in association with parenteral glucose and B-complex (B_1, B_2 and B_3) give excellent recovery rate and very less evidence of relapse.

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Mortality pattern in pigs based on postmortem examination

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Abstract

Based on postmortem (PM) findings in UAS piggery for the past eleven years (1983-1993) it was observed that 45.6 per cent of death were due to infectious cause viz., enteritis and pneumonia. From 1983-1993 there was a gradual increase in percentage of mortality over the years. Present study revealed unweaned piglets were more susceptible than weaned piglets for various causes of mortality. Mortality due to enteritis was higher in unweaned piglets and anaemia, physical trauma was higher in weaned piglets. Observation on sex predisposition on occurrence of various pathological entities indicated that males were more prone than females. Higher incidence of mortality was observed in S3 (June to September) season which could be attributed heavy rains, also higher rate of mortality was observed in S1 (January to February) and S3 seasons due to physical trauma which may be due to cold weather which makes animal less active predisposing the young ones for trampling which leads to physical trauma.

Keywords: Enteritis, Post mortem, Pneumonia, Physical trauma, Weaned and Unweaned.

Among the livestock production activities for economic consideration, piggery has been receiving an increased attention. A variety of infectious and non-infectious factors are attributed to mortalities in pigs. A systematic approach of combating the problems faced in piggery units based on priorities assessed is of great importance to suit the local needs. The present paper reports mortality pattern in pigs based on postmortem data in piggery unit of college.

Autopsy records for the period of eleven years of piggery unit maintained by veterinary college, Bangalore were collected with respect to age, groups, sex, weaned, unweaned status and seasons. (S1 Jan-Feb, S2 March -May, S3 June-Sept, S4 Oct- Dec).

During the period of eleven years, total of 1363 mortalities were recorded for both the sexes and different age group of animals. Of these autopsy records were available for 996 piglets. Based on the postmortem diagnosis,the pattern of mortality was categorized into sex, age groups and seasons.

The cause of death was enteritis, pneumonia, inanition, anaemia, and physical trauma. Among total mortalities, enteritis was predominant cause of death in 328. Followed by pneumonia in 294, inanition in 183, anaemia in 78 and physical trauma in 113 animals.

Age wise distribution of the mortality pattern during the period revealed 85% mortality in unweaned and 14.93% in weaned piglets due to enteritis. The respective percentage due to pneumonia was 62.9 in unweaned and 37.0% weaned piglets. Among non infectious causes, inanition was attributed in 73.2 % in unweaned and 26.8% in weaned piglets.

Anaemia was attributed as cause of death in 78.2% of unweaned and 21.8 % of weaned piglets, while physical trauma was attributed in 76.1% of unweaned and 23.9% weaned piglets.

Season wise 289 mortalities (21.20%) in S1 season, 319 (23.40%) in S2 season, 465 (34.00%) in S3 season and 295 (21.56%) in S4 seasons were recorded.

289 mortalities in S1 season, 41 (20.39%) were due to enteritis, 66 (32.83%) due to pneumonia, 39 (19.40%) due to inanition, 20 (9.95%) due to anaemia and 35 (17.41%) due to physical trauma. Among 229 mortalities in S2 season, 95 (41.48%) were due to enteritis, 61 (26.63%) due to pneumonia, 34 (14.84%) due to inanition, 20 (8.73%) due to anaemia and 19 (8.29%) due to physical trauma. In S3 season, 116 (24.94%) death due to enteritis, 96 (20.64%) due to pneumonia, 61 (13.11%) due to inanition, 26 (5.59%) due to anaemia and 36 (7.74%) due to physical trauma were recorded. While in S4 season , 76 (25.76%) death were due to enteritis, 71 (24.06%) due to pneumonia, 49 (16.61%) due to inanition, 12 (5.06%) due to anaemia and 23 (7.79%) due to physical trauma.

The postmortem findings in 996 pigs indicated infectious causes viz., enteritis and pneumonia as cause of death in 622 (45.6%) piglets and 374 (27.43%) piglets revealed noninfectious causes viz., anaemia, physical trauma and inanition as primary cause of mortality in

piglets, which simulating the findings of Pillai and Thomas (1984) and Hellmers (1986).

The seasonal influence on mortality pattern in the present study indicated that higher mortalities were due to enteritis, pneumonia, inanition and anaemia during June to September months. This may be attributed to heavy rains with higher atmospheric relative humidity leading to a stress full situation. However, the highest mortality due to physical trauma were in January-February and October to December months. Cold weather has been considered to result in low activity of piglets which are more prone for physical trauma (Cabrea *et al.,* 1990).

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Evaluation of antioxidative potential of aqueous extract of *Mentha piperita* by electron transfer reaction assays

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Abstract

The antioxidant property of aqueous extract of *Mentha piperita* (AEMP) was studied by electron transfer reaction assays. It revealed substantial antioxidative property with respect to 2, 2-diphenyl-2-picrylhydrazyl (DPPH) scavenging activity, reducing power on Cu (II) and total phenolics. However, chelating activity of AEMP was very poor.

Keywords: Antioxidative property, Extract, *Mentha piperita*

Mentha piperita extract has been used for treating loss of appetite, common cold, bronchitis, sinusitis, fever, nausea, vomiting and indigestion (Aktogan *et al.*, 2004) while its essential oil studied for antioxidative property (Mimica-Dukic *et al.,* 2003). AEMP has been reported to possess free radical scavenging capacity and antioxidant potential due to presence of phenolic acids (Damein *et al.,* 2003). The present study was conducted to investigate the antioxidative property of AEMP by electron transfer reaction methods.

The fresh green leaves of *M. piperita* at flowering stage were obtained from Medicinal Plant Research and Development Center, GBPUAT Pantnagar in month of April, 2007. Aqueous extract was prepared from these leaves as described by Damien *et al.* (2003) and Radoslaw *et al.* (2006). Antioxidative potential of AEMP was analysed by electron transfer reaction methods.

The level of total phenolics in extract was determined (Germano *et al.,* 2005). The scavenging effect of extract on 2, 2-diphenyl-2-picrylhydrazyl (DPPH) radical (Singh *et al.,* 2005), chelating activity of aqueous extract on ferrous ions (Fe^{2+}) (Junctachote and Berghofer, 2005) and its reducing power (Yen and Duh, 1993).

The concentration of total phenolics in AEMP was 786.5 mg of gallic acid equivalent as calculated from regression equation obtained from the standard curve. This value was well within the range as reported by Damien *et al.* (2003).

DPPH scavenging activity of AEMP was concentration dependent and at 5, 10, 15, 20 and 25 µg/ml of AEMP, scavenging activity was 4.69, 9.48, 10.63, 11.02 and 12.26%, respectively which was slightly lower but comparable to gallic acid scavenging activity of 12.36, 13.22, 16.67, 18.10 and 19.67, respectively. The IC_{50} values of DPPH scavenging activity of AEMP was 113.30 µg/ml which was higher than the IC_{50} values of DPPH scavenging activity of gallic acid (99.544 µg/ml). The IC_{50} values of DPPH scavenging activity of AEMP was slightly lower as compared to the value reported by Demien *et al.* (2003). The lower IC_{50} values indicate a better free radical scavenging property compared to other mentha varieties.

The chelating activity of AEMP at different concentrations of 0.10, 0.25, 0.50, 0.75 and 1.00 mg/ml was 1.460, 1.87, 9.28, 10.48 and 13.14% and these values were extremely low as compared to chelating activity of 0.02 mM EDTA (127.01%). Although AEMP exhibited an ability to chelate iron (II) ions in a dose dependant manner, the AEMP possesses very poor iron (II) chelating activity as compared to EDTA. This indicates that the amount of compound in AEMP to compete with ferrozine for iron (II) ions was less as compared to EDTA.

The reducing power of AEMP at different concentrations of 0.10, 0.25, 0.5, 0.75 and 1mg/ml were 14.50±1.31, 46.84±1.68, 64.85±3.91, 66.79±0.18 and 73.48±0.10%, respectively which was slightly lower but comparable with the reducing power of gallic acid as 27.40±2.38, 62.07±0.12, 76.91±0.19, 82.41±0.16 and 85.39±0.02%, respectively at similar concentration. The

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results indicate that AEMP possesses substantially higher reducing power on Cu (II).

It revealed that AEMP has substantial antioxidative potential with respect to total phenolic content, free radical scavenging activity and reducing power.

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Prevalence of cardiac diseases in dogs in Gujarat state

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Abstract

Prevalence study of cardiac diseases in 1,095 dogs revealed that 84 (7.67%) had signs suggestive of cardiac diseases confirmed by electrocardiography. The highest prevalence was of cardiac arrhythmias (53 cases; 63.1%) and it was more in Pomeranian (30 cases; 35.7%). Cardiac diseases were more prevalent in animals of 0-3 yr age group (39 cases; 46.4%) and they had highest prevalence of cardiac arrhythmias (26 cases; 66.6%). Cardiomyopathy (7 cases; 26.9%) and heart worm (4 cases; 15.4%) was found to be more in adult dogs (9 yr and above).

Keywords: Arrhythmias, Cardiac disorders, Cardiomyopathy, Dog.

The cardiac diseases in canines have not been magnified through the research and clinical point of view and very meager information have been documented in India. Hence, the present study was aimed to survey the prevalence of cardiac problem in canines of Gujarat State.

Total 1095 dogs reported at Teaching Veterinary Clinical Service Complex (Zaveri Clinics) of the Veterinary College at Anand and Shri Surat Panjarapole Prerit Nandini Veterinary Hospital at Surat were screened for the prevalence of cardiac disorders and their relationship with breed, age, sex and season was evaluated (Kelly, 1984). Dogs found to have signs compatible with heart disease were subjected to further detailed clinical investigation including history and cardiac examination including auscultation of the heart, blood pressure, electrocardiographic and radiographic techniques.

Overall 84 (7.67%) cases of cardiac diseases were observed in dogs. Highest prevalence was of cardiac arrhythmias (53 cases; 63.1%) followed by cardiomyopathy (14 cases; 16.7%) and heart worm (7 cases; 8.3%). The prevalence of AHF (acute heart failure) and other (low ventricular complexes, ST segment depression, ST segment slurring) abnormalities was 3.6% (3 cases) and 8.3% (7 cases), respectively. Changkija (2007) noticed 56.67% cases of arrhythmias and conduction disturbances in dogs.

Fioretti and Delli (1988) reported similar findings in Italy where prevalence rate of heart diseases was 11% out of 7,148 dogs studied. This increase in the recognition of more cardiac diseases might be due to the advancement in the field of veterinary care since the 1950s and also changing attitude of dog owners towards the health of their pets. Although conduction disturbances may occur with primary heart disease or diseases primarily affecting the vagal activity, their frequent occurrence in the absence of detectable heart disease suggests vagal activity as an important factor in majority of cases.

The cardiomyopathy was present in 16.7% cases. Kibar and Alkan (2005) in a study of 30 geriatric dogs with suspected heart diseases evaluated clinically, radiographically and ultrasonographically the cardiac dilatation and hypertrophy of two or more chambers.

The over all prevalence of heart worm was 8.3%. Electrocardiographic changes such as atrial fibrillation (AF), Ta wave, low voltage complexes and sinus arrhythmias either alone or in combinations suggestive of cardiomyopathy have recently been reported in dogs with clinical dirofilariasis (Varshney *et al.,* 2008).

The cardiac problems were more (35.7%) in Pomeranian breed as compared to other breeds agreeing with the observations of Chankija (2007). The prevalence of specific cardiac diseases observed in Pomeranian breed were cardiac arrhythmias (56.6%), cardiomyopathy (16.7%) and heart worm (13.3%). The over all prevalence of cardiac problems was observed to be lower in Cocker Spaniel, Boxer, Japanese Chihuahua and Bull Mastiff (1.2% each).

The exact cause of these findings is not explainable, since in any geographical area, the breed prevalence may be affected by the preference of specific breeds by owners of that area or could be due to close association of this breed with humans may remained under stress in urban areas.

Cardiac abnormalities were higher (46.4%) in dogs up to 3 yr age followed by aging dogs of more than 9 yr old (31.1%). In young ones cardiac

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Table 1: Overall prevalence of different cardiac diseases in dogs

Disease	Cardiac arrhythmias (n= 53)				C	Cardio myopathy	Heart Worm	Others	Acute Heart Failure	Total
	A	B								
		B1	B2	B3						
Frequency	14	26	2	3	8	14	7	7	3	84
% of total	63.1					16.7	8.3	8.3	3.6	100
Prevalence % (CA)	26.4	49	3.8	5.7	15.1					100

A: Sinus Rhythm, B: Abnormalities of Impulse Formation, B1: Supraventricular, B2: Atrioventricular (AV) Junction, B3: Ventricular, C: Abnormalities of Impulse Conduction, CA: Cardiac Arrhythmias

arrhythmias were highest (66.6%). Herrtage (2003) stated that heart diseases were relatively common in dogs. The incidence of acquired heart diseases in dogs and cats increases with age. Miller *et al.* (1989) opined that approximately 25% of heart disease in dogs occur between the age of 9 and 12 yr, and 33% in dogs above 13 yr and older.

The prevalence of heart worm in the present study was found to be highest (15.4%) in adult and aging dogs (above 9 yr age group) agreeing with the observations of Varshney *et al.* (2008).

Of 84 dogs with cardiac abnormalities, 58 (69.0%) were male and 26 (31.0%) female. The prevalence of cardiac arrhythmias (38 cases; 65.4%) was more in males followed by cardiomyopathy (9 cases; 15.5%), heart worm (5 cases; 8.6%), other abnormalities (4 cases; 3.4%) and AHF (2 cases; 3.4%). Females had comparatively lower prevalence of cardiac arrhythmias (15 cases; 57.7%), cardiomyopathy (5 cases; 19.2%), other abnormalities (3 cases; 11.5%), heart worm (2 cases; 7.7%) and AHF (1 case; 3.8%). It was concluded that male dogs appear to be over-represented in Dalmatian DCM, which may suggest an X-linked trait although large studies have not been performed. Calvert *et al.* (1997) stated in their retrospective studies performed on populations of dogs with heart failure or sudden death attributed to DCM, males were affected nearly twice as often as females.

It appears that heart diseases are significant disease entity as a cause of morbidity in dogs and these should be taken into account during routine examination of a canine patient.

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Prevalence of peste des petits ruminants (PPR) in small ruminants of Karnataka

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Abstract

Total 158 outbreaks, 2205 attacks and 407 deaths were recorded due to PPR in Karnataka and therefore 580 representative samples, comprising of nasal swabs, rectal swab and tissue samples were forwarded for confirmation. By sandwich-ELISA kit 45 (7.76%) samples were positive. The disease caused 0.018% morbidity and 18.4% mortality %.

Keywords: PPR, Prevalence, Sandwich ELISA.

Economic losses due to PPR alone in India have been estimated to be 1800 million Indian rupees annually (Bandyopadhyay, 2002).The Sandwich -ELISA diagnostic kit has been found to be extremely useful for detection of PPRV antigen in clinical samples (Singh, 2002). This study was undertaken with an intention to detect PPRV in clinical samples using this kit and to derive estimates of overall prevalence of PPRV.

Total 158 outbreaks, 2205 attacks and 407 deaths due to PPR were recorded during 2006-08 from different districts of Karnataka. Total 580 samples were screened using PPR Sandwich-ELISA kit for PPRV antigen detection as per the user manual provided by the Rinderpest laboratory, Division of Virology, IVRI, Mukteswar. The plates were read at 492 nm and the cut off value was calculated as given in the manual. Samples showing OD more than the cut off in both the duplicate wells were considered as positive, whereas, samples showing OD less than the cut off in both the duplicate wells were considered negative. Further, a sample positive in one well but negative in the other duplicate well was considered as doubtful and retested.

Of 580 clinical samples tested by PPR sandwich-ELISA kit, 45 (7.76%) samples gave positive reaction.

The overall morbidity and mortality rates due to PPR during the period under report were 0.018% and 18.4% respectively. Extremely low incidence rate of PPRV (1.11% in sheep and 2.07% in goats) was observed by Kumar *et al.* (2002) in India. Rao *et al.* (2001) recorded 16% morbidity during PPR outbreaks. Contrary to this, higher incidence of PPR with 60% morbidity rate was observed by Pawaiya *et al.* (2004) in Rajasthan.

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Detection of canine Parvovirus infection by HA and HI tests

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Abstract

Among 128 dogs with symptoms of vomition, bloody diarrhoea, rise of temperature and dehydration, 58 suffered from parvovirus infection as diagnosed by clinical signs and confirmed by HA and HI tests. The HA and HI tests were found simple and rapid tests for detection of canine parvovirus infection through faecal samples.

Keywords: Canine parvovirus, HA, HI

The canine parvovirus (CPV) was first recognized in 1978 as the cause of two previously unknown disease syndromes of dogs, i.e. myocarditis and gastroenteritis (Appel *et al.,* 1978). Rapid and early diagnosis of the disease is essential (Pirjo *et al.,* 1986) due to its highly contagious nature. Faeces of dog affected with parvovirus infection usually contain large number of virus particles during early stage of infection. Thus, identification of CPV in faeces is of high diagnostic value.

Total 128 faecal samples were collected in hanks balanced salt solution, from dogs brought to Teaching Veterinary clinical service complex, Jabalpur Veterinary College with clinical signs of vomiting and diarrhoea. The samples were centrifuged at 10,000 rpm for 10 mins at 4^0C and the supernatant was used for detection of viral antigen.

Haemagglutination (HA) test was carried out as per the method of Carmichael *et al.* (1980) in 96 U bottomed microtiter plate. A 2- fold serial dilution of the test sample starting from 1:2 was made in phosphate buffered solution (PBS). Then 25 µl of 1% pig erythrocytes were added to all the wells. The plate was then incubated at 4^0C for 1 hr. The HA titre was expressed as the reciprocal of highest dilution of virus showing agglutination.

The hyper-immune serum (raised in rabbits) was inactivated at 56^0C for 30 mins in a water bath. A 1:10 dilution of serum in PBS was treated with 0.1 parts of 50% pig erythrocytes to remove non specific haemagglutinin. Serum was kept for 2 hr at room temperature and then centrifuged at 1500 rpm. Then 50 µl of PBS was dispensed into each well numbered from 1 to 12 and 50 µl of 1/10 diluted serum was taken into first well with the help of micropipette and mixed well. Then 50 µl mixture was taken from first well and dispensed into second well. This process was repeated till the second last well and discarded 50 µl from the last well and 50 µl of 4 HA dilution of antigen was added to each of the wells except the last two control wells. 50 µl of the 1% RBC suspension was added into all wells. The plate was shaked and incubated at 37^0C temperature for 45 min. The HI titer was expressed as the reciprocal of highest dilution of serum inhibiting agglutination.

Out of 128 faecal samples from clinical cases of dogs exhibiting haemorrhagic or non haemorrhagic gastroenteritis and tested by HA- HI test, 58 samples were reactive. The HA titre ranged between 1:64 to 1:512 whereas, only eight samples showed the titre as 1:1024. However, HI titre ranged from 1:320 to 1:1280. The HA-HI test was found highly sensitive when performed on clinical samples and it was cost effective (Rai *et al.,* 1994). Thus HA and HI tests are simple and rapid test for detection of canine parvovirus infection in faeces.

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Efficacy of ayurvedic liniment against ticks of sheep and goats

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Abstract

The efficacy of 0.1, 0.2 and 0.5% aqueous emulsion of an ayurvedic liniment against ticks of sheep and goats was evaluated. At 0.1%, it gave 44.00% efficacy in sheep and 54.15% in goats. In sheep, 0.2 and 0.5% concentration showed 73.31and 65.15% efficacy while in goats 66.83 and 72.47%, respectively on day 21. It was found fairly effective in controlling ticks in these animals.

Keywords: Goats, Sheep, Ticks, Treatment

Though chemical acaricides are effective in controlling ticks on livestock, many of them result in emergence of resistance, environmental pollution and health hazard to man due to passing residues in milk and meat (Vatsya, *et al.,* 2006). Therefore, plant products to control ticks of livestock have been evaluated (Muraleedharan and Sahadev, 2007; Muraleedharan *et al.*, 2008). An ayurvedic liniment was evaluated against natural infestation of ticks of sheep and goats in the present study.

Tick infested sheep and goats were selected at random for the trials from the flock maintained in the farm. Ticks attached to the pinna of both ears were counted in all the animals before treatment as well as on day 7, 14, and 21 post-treatment. In the preliminary trial, 0.1% aqueous emulsion of ayurvedic liniment applied by cotton swab on ticks on the ears of 10 sheep and 10 goats only once and 5 sheep and 5 goats having tick infestations were kept as respective control. In trial II, 10 sheep and 10 goats, divided equally into two groups and each was treated with 0.2 and 0.5% liniment respectively. The percentage of efficacy was determined by using the formula: $[1- (T_2/T_1) \times (C_1/C_2)] \times 100$ where T_1 is pre-treatment and T_2 is post-treatment means of tick counts, while C_1 and C_2 are the corresponding values for the control group. The ticks collected from the ears were identified to generic level.

The ticks belonged to *Hyalomma* and *Haemaphysalis* species. The liniment showed reduction of ticks from the very next day of its application on the ear pinnae. At 0.1% strength, it was 44.00% effective on day 21in sheep and 54.15% on day 5 in goats. In sheep, 0.2 and 0.5% concentration revealed 73.31 and 65.15% efficacy on day 21 while in goats 66.83 and 72.47% efficacy, respectively, were seen (Table1). The biological phenomena of dropping off and attachment of the stages of the life cycle of ticks in animals, besides allowing them to graze in natural and tick-infested surroundings would have some influence on the results. The plant extracts/oils available in liniment are used mainly for rheumatic pain in Ayurvedic Medicine. Some of its constituents like deodar oil, turpentine oil and eucalyptus oil have known to have ectoparasitic action too. It was expected that these ectoparasitic ingredients along with other constituents of the drug would have some combined beneficial effect in controlling the ectoparasites. That is also the reason to select this liniment for the present trials against ectoparasites. The efficacy of a single plant extract can be enhanced by judicious combination with others having similar action or their active principles which have adjuvant properties or toxic activity against ticks (Maske *et al.*, 2000). Many plants have tickicidal or repellent action either alone or in combination and the extracts of some of them is being used in proprietary formulations for control of ticks (Chhabra and Saxena, 1998). Further studies are warranted to find out the individual efficacy of such constituents of this liniment at various strengths, if it is not clearly known. The studies suggest that the ayurvedic liniment has fair effectiveness in controlling ticks on the sheep and goats.

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*Marketed by M/s Retort Pharmaceuticals Private Limited, Chennai-600 060 and each 25 ml contains Mahanarayana thailam 10 ml, Vatanashak thailam 2.5 ml, Deodar oil 2.5 ml, Nilagiri thailam 2.5 ml, Gandhapura thailam 2.5 ml, Tarpain thailam 2.5 ml, Mash thailam 2.5 ml and Kapoor 2.5 g.

Table 1. Efficacy of different strength of ayurvedic liniment in sheep and goats

Trials No.	Animals	Treatment	n*	Dilution (%)	Day/ mean tick count				% efficacy
					0	7	14	21	
I	Sheep	Experimental	10	0.1	26.2	16.2	18.9	24.3	44.00
		Control	5	-	25.0	31.8	26.4	41.4	-
	Goats	Experimental	10	0.1	21.1	25.4	36.00	35.0	**54.15
		Control	5	-	14.2	16.6	15.2	23.4	-
II	Sheep	Experimental	5	0.2	47.2	31.6	19.2	21.0	73.31
			5	0.5	48.2	31.2	27.0	28.0	65.15
		Control	5	-	45.0	53.0	60.0	75.0	-
	Goats	Experimental	5	0.2	51.8	38.4	40.0	35.8	66.83
			5	0.5	53.0	22.8	28.6	30.4	72.47
		Control	5	-	60.0	82.0	90.0	125.0	-

** number of animals used ;**as on day 5 (mean tick count 13.9)*

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Comparative efficacy of some anthelmintics in gastro-intestinal nematodiasis in cows

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Abstract

Therapeutic efficacy trial of four different anthelimintics in clinical gastro-intestinal nematodiasis in lactating cows was carried out on the basis of faecal sample examination and percent reduction in EPG at weekly intervals. Ivermectin and oxfendazole bolus were found 100% effective while N*igella sativa* and *Caesalpinia crista* showed 76.2 and 77.4% efficacy at the end of 28 days trial. Recovery was faster with ivermectin, compared to oxfendazole.

Keywords: Cows, Gastro-intestinal nematodiasis. Therapy.

High efficacy of a variety of chemical anthelminitic agents against the gastro intestinal nematodes in cows under varying geo-climatic and managerial conditions has been reported (Vatsya *et al.,* and Lombard *et al.,* 1986). However, in view of the predominantly rural-based agrarian economy in India, increasing use of cheaper, yet potent, locally available anthelmintics is needed. The seeds and seed extracts of *Nigella sativa, Linn.* Kalajira and *Caesalpinia crista, Linn.* (Gataran) merit attention because of their several therapeutic properties including anthelmintic action (Anjaria, 2002).

This paper reports the comparative efficacy of various anthelmintics against naturally acquired infection of gastro-intestinal nematodiasis in cows on the basis of reduction.

Total 24 indigenous lactating cows in Dayodaya Trust Goushala, Tilwara village in Jabalpur district with established worm load of gastro-intestinal nematodes: *Stronygles* or mixed infection of *Strongyles, Strongyloides sp.* and *Eimeria sp.* and to a lesser extent *Trichuris* and *Moniezia sp.* were distributed randomly into 4 qual groups of 6 animals. Gr T1 received ivermectin bolus* @. 200 mg/kg b wt single oral dose, gr T2 *N. sativa**** seed powder @ 50 mg/kg b wt three consecutive daily oral doses-gr T_3 oxfendazole bolus @ 5 mg/kg* single oral dose, and gr T4 *C. crista* seed powder*** @ 50 *mg/kg b wt* three consecutive days oral doses. Six healthy indigenous lactating cows with zero EPG count in three consecutive faecal samples served as control.

The magnitude of infection was evaluated on the basis of sequential EPG counts (Soulsby, 1982), and the therapeutic efficacy of drugs was determined by the percent reduction at different post-treatment intervals and pretreatment EPG count. Thus, anthelmintic efficacy (%) = a - b/ a x 100, where a , EPG count on day 0 (pre-treatment) and b = EPG_count at a given interval (Mohapatra *et al.* 1990). The data were statistically analyzed with the completely randomized design (Snedecor and Cochran, 1994).

In gr T1, the minimum duration was required for total elimination of the gastro-intestinal nematode worm load, evidenced by zero EPG count attesting to 100% therapeutic efficacy on day 21. Similar observations were made by Saeki *et al.*(1995) and Vatysa *et al. (2008)* All animals in gr T2 responded to the anthelmintic principle (s) contained in *N. sativa* seed powder. However, the drug was effective only to the extent of 58.7% and 76.2% on day 21 and 28, respectively (Table 1). In gr T3, all animals responded well to oxfendazole, and the drug was effective to the extent of 97.4% and 100% on day 21 and 28, respectively. This finding is in agreement with the reports of Chalmers (1985) and Lombardo *et al (*1986). In gr T4, all animals responded to the anthelmintic ingredients present in C. *crista* crude seed powder, but the drug was effective only to the extent of 67.9% and 77.4% on day 21 and 28, respectively (Table 1).

The seeds and seed extracts *of N. sativa and C. crista* have been used for anthelmintic and other properties in the indigenous system of medicine (Anjaria,

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Table 1: Faecal EPG count in cows receiving different anthelmintic treatment.

Treatment Group	Interval (day)				
	Pre-treatment	Post-treatment			
	0	7	14	21	28
T_1, Ivermectin	1466.7±66.3	116.7±19.1 (87.3%)	16.7±2.7 (98.2%)	0 (100%)	0 (100%)
T_2, *Nigella sativa*	1050.0±107.3	550.0±62.9 (47.6%)	500.0±55.3 (52.4%)	433.3±36.7 (58.7%)	250.0±25.6 (76.2)
T_3, Oxfendazole	1266.7±79.2	283.3±22.6	150.0±13.4	33.3±4.9	0
T_4, Caesalpimacrista	1400.0±90.7	816.7±79.1 (41.7%)	566.7±58.4 (59.5%)	450.0±45.9 (67.9%)	316.7±30.7 (77.4%)
T_5, Healthy Control	0	0	0	0	0

Figures in parentheses represent the therapeutic efficacy, evidenced by percent reduction in the faecal EPG count

2002). Presumably, in the present study, the active principles present in these plant products have not been absorbed in adequate quantities required to maintain the optimal blood titres and cleanse the inactivated adult parasitic nematodes from the GIT and bring down the EPG count to the minimum

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Clinical Articles

Management of *Babesia gibsoni* infection in a Rottweiler pup

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Abstract

A male Rottweiler pup with history of anorexia was found positive for *Babesia gibsoni* infection on blood smear examination. Pup was given inj. diminazine aceturate @ 3.5 mg/kg b wt im. It had an uneventful recovery from the disease within the next three days.

Keywords: Babesia gibsoni, Babesiosis, Rottweiler pup, Treatment

The clinical severity of babesiosis in dogs is influenced by the species of parasite and to a lesser extent by the age and immune status of the affected animal. *Babesia gibsoni* first recognized in India in year 1910 (Patton,1910) , involves *Haemaphysalis bispinosa*, *H. longicornis* (Schoeman and Leisewitz, 2006) and *Rhiphicephalus sanguineus* (Tiwari and Varshney, 2002) vectors. The disease is diagnosed by identifying organisms on blood smears and visualized better with. The present paper reports a case of *Babesia gibsoni* infection in a Rottweiler pup.

A male Rottweiler pup (2½ months) was presented to small animal clinic with the history of anorexia for the previous three days with ruffled hair coat and tick infestation. Clinical examination revealed fever (39 ºC) blanched mucous membranes and swollen popliteal lymph nodes. Blood smear was found positive for *Babesia gibsoni* DLC showed polymorphs 43%, lymphocytes 53%, eosinophils 3% and monocytes 1%. while Hb, PCV, TEC and TLC were 5.3 g/dl, 16%, 2.67 x 10^6/µl and 9200/µl respectively.

The pup was treated with inj diminazene aceturate @ 3.5 mg/kg b wt im and inj. chlorpheniramine maleate @ 2 mg/kg b wt im. Diminazene aceturate was repeated at the same dose two days later along with liver extract (inj Belamyl 1 ml im) and iron dextran (inj Imferon 1 ml deep im). Topical spray of 0.1% cypermethrin was done to control the ticks. The animal had an uneventful recovery from the disease within three days treatment.

Blood smear examined three days after the second dose of diminazine aceturate did not reveal any blood parasite(s). Diminazine aceturate is probably the most commonly used drug worldwide and is a diamidine derivative thought to interfere with aerobic glycolysis and inhibit DNA synthesis in the parasite (Mc Dougald and Roberson, 1988).

Hemolytic anaemia is the primary manifestation of *Babesia gibsoni* infection and usually causes acute parasitemia followed by development of a chronic asymptomatic carrier state (Boozer and Macintire, 2003). In *Babesia gibsoni* infections, parasitemia rarely exceeds 10%, yet severe anaemia frequently develops (Schoeman and Leisewitz, 2006). As the case was diagnosed much earlier it did not progress to very severe illness unlike described by Sundar *et al.* (2004).

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Therapeutic management of trypanosomosis in dogs concurrently infected with hepatozoonosis, spirocercosis and ancylostomosis

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Abstract

Two non descript dogs had history of weakness, inappetence, fever and gradual development of corneal cloudiness. Blood smear examination revealed *Trypanosoma evansi* infection while faecal examination revealed spirocercosis and ancylostomosis. Hepatozoonosis was also detected few days after the therapy for trypanosomosis. The dogs were treated with diminazene aceturate with intravenous dextrose, chlorpheniramine maleate, antibacterial eye drops and haematinics for effectively managing corneal opacity. The animals were kept under observation and showed recovery over a period of 30-35 days.

Keywords: Hepatozoonosis, Spirocercosis, Trypanosomosis, Ancylostomosis, Dog

Trypanosomosis is economically important disease caused by *Trypanosoma evansi* and is responsible for varied clinico-haematological and biochemical altereations in dogs (Arora and Pathak, 1995). Congested conjunctival mucous membrane, corneal opacity, moderate dehydration and generalized weakness and oedema of head and neck have also been reported in naturally occurring cases of canine trypanosomosis (Krishnamurthy, 2005; Varshney, 2005). The present communication reports therapeutic management of trypanosomosis in dogs concurrently infected with other parasitic infections.

Two non descript dogs (one 2 yr old male weighing 15kg and other 2 yr old female weighing 10 kg) were brought to the Veterinary Teaching Hospital of the college with the history of gradual development of corneal cloudiness over a period of 10-12 days. The dogs were anorectic with history of tick infestation and high rise in body temperature few days back. The animals were earlier treated with antibiotics and anti pyrtetic drugs without any improvement. No vaccination and deworming had been undertaken in the recent past. On clinical examination, the dogs were dull, depressed and moderate to severely dehydrated with congested mucous membrane and weak pulse. The rectal temperature was within normal limits with no visible lesions on the abdomen. On ophthalmic examination bilateral corneal opacity with partial or no loss of vision was noticed. To confirm the diagnosis, coprological examination for parasitic ova and haematological examination for Hb, PCV, TEC, TLC, DLC and haemoprotozoans were undertaken. Both the animals were found positive for spirocercosis and ancylostomosis on faecal examination. Haematological examination revealed decline in haemoglobin and TEC values with moderate infection of trypanosomosis.

The animals were accordingly given 95-100 ml of 5% dextrose saline, chlorpheniamine maleate (Zeet®) @ 0.5 mg/kg b wt. im around 20 min before administration of diminazine aceturate (Nilberry®) @ 5mg/kg b wt deep im once. The animals were also prescribed pyrantel pamoate suspension (Nemocid®) @ 10mg/kg b wt. orally as anthelmentic. Oral and parenteral iron supplementation was recommended as haematinic for a week. Supportive treatment included liver tonics (Liv 52® drops) and protein supplementation (GRD®) in milk for atleast 10 days. Antibacterial eye drop (Tobacin®) was also prescribed for a week. The owner was advised for follow up after a week and copro-haematological examinations.

There was general improvement in body condition after 3days. After 10 days, the corneal opacity was significantly reduced and animals appeared alert. The coprological and blood smear examination were negative for any parasitic ova and trypanosomes, respectively. However mild degree of parasetaemia with *Hepatozoon canis* in neutrophils was evident. Doxycyclin (Doxtop®) @ 10 mg/kg b wt. orally for 10 days along with oral haematinics, liver tonics and multi vitamins were advised for a week. After 20 days corneal opacity almost reduced and the dogs became almost normal.

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Varshney *et al.* (2003) reported corneal cloudiness in 30% cases of canine trypanosomosis in addition to inappetance, dehydration, kerato conjunctivitis and progressive emaciation. Similar clinical observations as observed here but with unilateral corneal opacity in right eye was also reported reported by Krishnamurthy (2005). Diminazene aceturate is an effective trypanocidal drug in dogs and can be used as single dose (Krishnamurthy, 2005). Spirocercosis and ancylostomosis were effectively managed using pyrantal pamoate in standard doses. Hepatozoonosis might have flared later as a result of immunosuppression/stress due to trypanosomosis and was managed using doxycyclin as per the dosage regimen.

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Management of perineal hernia along with prostatic hyperplasia in a Pomeranian dog

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Abstract

A seven year old Pomeranian dog was brought to the Clinics with the complaints of swelling in the perineal region and difficulty in urination since last one month. Clinical examination revealed it as a case of perineal hernia with prostatic hyperplasia. The surgery was planned under general anaesthesia and the hernial ring was repaired as per routine procedures.

Keywords: Dog, Perineal hernia, Treatment.

Perineal hernia results from failure of pelvic diaphragm to support the rectal wall which stretches and deviates. Though the exact cause of muscular weakness is unknown, it results in caudal displacement of intra-abdominal organs or deviation or dilatation of the rectum into the perineum (Bojrab and Toomey, 1981). Pelvic and occasionally abdominal contents may protrude between the pelvic diaphragm and the rectum. The majority of perineal hernia cases occur in middle aged or older intact males as in these dogs, testosterone causes a chronic enlargement (hypertrophy) of the prostate gland. As the animal strains to urinate and defecate around the enlarged prostate, the tissues adjacent to the rectum weaken, allowing fat or abdominal organs to push out around the rectum and form a pouch under the skin. This pouch may enlarge when straining pushes tissue out into it and it may become smaller as tissue moves back into the abdomen. Benign hyperplasia, together with other pathological conditions resulting in prostatic enlargement, generally results in tenesmus assaociated with defecation and urination (Weaver, 1980). The present paper reports a case of perineal hernia along with prostatic hyperplasia.

A seven years old Pomeranian dog was brought to the College Clinics, with the complaint of swelling on the perineal region and difficulty in urination since last one month. Clinical examination revealed it as a case of perineal hernia. Rectal examination allows assessment of the laxity in the rectal wall support and prostate size. On radiographic examination, a solid mass (suspected prostatic hyperplasia) was seen protruding out of the perineum. The presence of urinary bladder was diagnosed in protruding mass by pneumocystography. Warm water enema was given to the animal to soften stool for minimizing surgical site contamination.

On the basis of above findings, surgery was performed under thiopentone anaesthesia given upto the effect after proper premedication with atropine and diazepam. Opening of hernial sac and gentle

Fig. 1 Dog showing perineal hernia

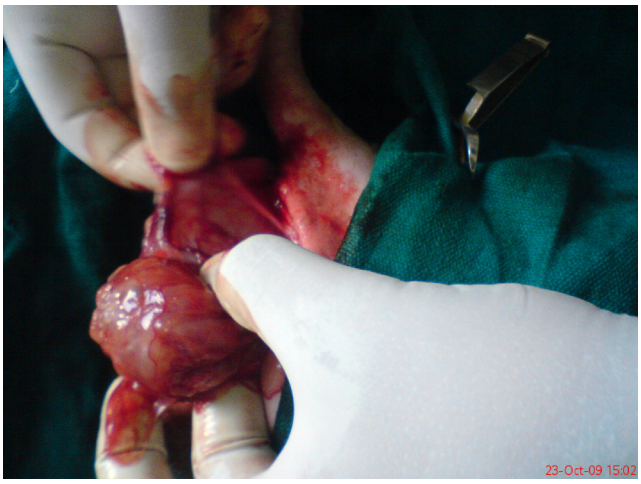

Fig. 2 Arrow showing prostatic hyperplasia

manipulation of the contents confirmed the presence of enlargement of prostatic hyperplasia. The protruded mass, comprising of the bladder and intestine, was replaced to its normal position and hernial defect was sutured in routine manner. After closure of the hernial defect, the superficial perineal fascia was mobilized laterally from the skin and closed routinely. A thorough rectal examination was performed to evaluate the integrity of the repair. Castration was also performed in the animal because of its beneficial effects on prostatic disease prophylaxis despite its questionable role in preventing the recurrence of perineal hernia (Mann, 1989). The association between castration and the recurrence of a perineal hernia after surgical repair has been reported to be 2.7 times greater in dogs that were not castrated than in dogs that were castrated (Hayes *et al.*, 1978). Cystic type of hyperplasia observed in present case confirms the findings of Poulet (1985).

Postoperatively, a broad spectrum antibiotic (ceftriaxone, 250 mg) was given twice a day for 5 days along with meloxicam (1 ml) daily for 3 days. Antiseptic dressing of surgical wound was done with liquid povidone iodine daily till complete healing occured and sutures were removed on 12th postoperative day. Follow up of the case revealed that the dog was healthy even after 2 month of surgical treatment. A low residue diet was recommended for first few days to help preventing straining during defaecation, which may lead to disruption of the perineal hernia repair.

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Rare occurence of *Coenurus* cyst in muscular and subcutaneous tissue of sheep

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Abstract

Among 189 sheep maintained in sub-temperate region, 9 sheep showed fluctuating non- inflammatory swelling in throat, neck and shoulder region. On exploratory puncture, swelling revealed cyst and on surgical removal the whole cysts were removed and identified as coenuruses by morphometry.

Keywords: *Coenurus*, Sheep,*Taenia multiceps*

The metacestode develops in the brain and spinal cord of sheep; however their occurrence especially in goats, in subcutaneous or intra muscular tissues and other organs has been noticed. Nervous lesions, due to presence of cysts, lead to neurological symptoms that are quite discrete in nature and may be fatal. Cyst in muscles may cause muscular pain or impaired function of organs involved. However, the animals in most cases remain normal without symptoms and condition is diagnosed only after the death of the animal. Such intra muscular and subcutaneous presence of cysts was referred to be a different agent, *Taenia gaigeri* but the difference was observed to be due to host involved, i.e goat (Soulsby,1982). This paper reports a rare incidence of coenurus in sheep.

The study was conducted at Southern Regional Research Centre of Central Sheep and Wool Research institute located in upper Kodai hills. The sheep are grazed 8 hr/day on pasture and supplemented with 150 g pelleted concentrate per head/day. Nine sheep aged around 2 yr out of 189 sheep maintained showed symptoms of non-inflammatory swelling in inter-muscular, intra-muscular and subcutaneous area (jaw, shoulder region and neck). Exploratory puncture was made and diagnosed as cyst, the cyst areas were surgically prepared for removal of cyst and removed surgically. The operated area was sutured by using non- absorbable suture material leaving a drain for fluid drainage.

The animals were treated with strepto-penicillin 2.5g, diclofenac sodium 1.5ml im. The surgical wound was applied with antiseptic ointment. The cyst locations were recorded and their sizes measured in floating condition using a vernier caliper. The cystic fluid was measured using a measuring cylinder after rupturing the cyst in a petri dish.

Out of 9 cysts 3 were in intra-muscular tissue, 2 in inter-muscular tissue and 4 cysts in subcutaneous tissue. The collected cysts were examined and confirmed as *coenurus* by morphometry. The diameter of cyst and cystic fluid varied from 2.5 to 4 cm and 25 to 45 ml respectively. The cysts in subcutaneous tissue were larger than other sites. Biyikoglu *et al.* (2001) noticed 0.5 to 4.2 cm diameter of *coenurus* cyst in sheep. Soulsby (1982) reported that the *coenurus* cyst occurs in brain and spinal cord of sheep. Bhalla and Negi (1962), Singh and Singh (1972) and El-sinnary *et al.*(1999) reported subcutaneous and muscular form of coenurosis, the cysts were reported from subcutaneous tissues of the base of the ears and in thigh muscles, diaphragm, inter costal muscles, pancreas, liver, lung, heart, adrenal gland, parotid salivary gland, mesenteric lymph node and other organs in goat. But in our study the cysts were in muscular and subcutaneous area of sheep.

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Clinical and haemato-biochemical changes in dilated cardiomyopathy associated heart failure in dogs

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Abstract

Total 886 dogs presented to Veterinary Hospital Bhoiguda, with the history and signs related to heart failure were subjected for clinical and physical examination. Radiography and echocardiography was done in some cases to confirm dilated cardiomyopathy (DCM) associated CHF. Exercise intolerance, respiratory dyspnoea at rest and anorexia was seen in all the affected dogs while cough, weight loss, pale mucosa, ascites and peripheral edema, cyanosis and syncope were seen in few dogs. Low Hb and TEC and elevated TLC with increase in CKMB, LDH and NA and low total protein and albumin were recorded in CHF dogs.

Keywords: Dilated cardiomyopathy, Heart failure, Haematology, Biochemistry, Dog

Heart failure occurs when cardiac function is sufficiently compromised to result in clinical signs (Buchanan, 1992). Although clinical signs may appear suddenly, most cardiac diseases are chronic in nature that leads to inadequate cardiac output to meet the perfusion and exercise tolerance. Dilated cardiomyopathy is the most common underlying cause of congestive heart failure (CHF) in dogs (Rubin, 1991). The present paper records clinical manifestations, haematological and blood biochemical profile of dilated cardiomyopathy associated heart failure in dogs.

The study was conducted during October 2006 to November 2008 on 886 dogs presented at College Veterinary Hospital, Bhoiguda, Hyderabad with the signs suggestive of cardiac disease such as exercise intolerance, dyspnoea at rest, cough and cyanosis. Using physical, radiological and echocardiographic examination, 431 dogs were diagnosed for different cardiac diseases of which 278 dogs suffered from congestive heart failure. Of these, 30 dogs were confirmed for dilated cardiomyopathy (DCM) associated congestive heart failure which were examined clinically and blood was collected for hematological (Hb, PCV, TEC, TLC and DLC), biochemical (CKMB, LDH, ALT, total protein, albumin, BUN and creatinine) and electrolytes (Na, K and Cl) changes. For comparision blood from 10 apparently healthy dogs was also collected.

In affected dogs exercise intolerance (65.47%), dyspnoea at rest (61.25%), anorexia (57.68%), cough (42.85%), going down in condition (39.14%), pale mucosea (26.65%), ascites (11.26%), peripheral edema (7. 80%), cyanosis (5.64%), and syncope (2.35%) were recorded. Auscultation of cardiac patients revealed abnormalities like murmurs, gallop sounds and arrhythmias that were similar in all the CHF patients.

Exercise intolerance might be attributed to forward failure noticed in cardiac diseases. When the cardiac output was extremely reduced the patients were prone to collapse/syncope (Ristic, 2004). Increased respiratory efforts or respiratory dyspnoea at rest in CHF dogs could be attributed to pulmonary edema, congestion and impaired cardiac output, leading to shortness of breath, increased respiratory rate and panting (De Francesco, 2002). Shallow tachypnoea, increased panting cough and dyspnoea occur due to left side heart failure (Dukes McEwan, 2000). Cough is associated with the compression of left main stem bronchus by the dilated left atrium, hence correlated with the left side heart failure. Ristic (2004) opined that the cough is the most common complaint by the owner and usually related to left atrial enlargement causing tracheal compression. Loss of appetite in congestive heart failure may be a consequence of fatigue or dyspnoea associated with CHF, or due to the effect of medications used to treat CHF or feeding of an unpalatable diet such as severe salt restriction. Freeman *et al.* (2003) also reported anorexia in 34-75% dogs with cardiac disease.

There was significant reduction in Hb and TEC while TLC was elevated in affected dogs (Table 1). Biochemical analysis revealed significant increase in CKMB, LDH and Na while total protein and albumin were decreased (Table 1). De Morias (2000) and Ristic (2004) suggested that though hematology in CHF was

Table 1: Haemato-biochemical findings in DCM associated CHF dogs (mean ± SE)

Sl. No.	Parameter	Apparently healthy dogs	Affected dogs
1	PCV (%)	38.86 ± 0.22	38.36 ± 1.05
2	Hb (g/dl)	13.02 ± 0.24	12.17 ± 0.32*
3	TEC (X 10^6/ µl)	6.10 ± 0.12	5.34 ± 0.16*
4	TLC (X 10^3/ µl)	8.12 ± 0.45	9.08 ± 0.29*
5	Neutrophils (%)	69.25 ± 0.26	71.12 ± 0.23
6	Lymphocytes (%)	25.72 ± 0.5	24.22 ± 0.54
7	Eosinophils (%)	2.89 ± 0.23	2.02 ± 0.22
8	Monocytes (%)	2.14 ± 0.12	2.64 ± 0.36
9	*CKMB (U/L)*	20.1 ± 0.14	59.65 ± 2.38**
10	LDH (U/L)	88.25 ± 0.56	141.4 ± 5.14**
11	ALT (U/L)	33.68 ± 0.24	33.00 ± 1.41
12	TP (g/dL)	6.12 ± 0.02	5.36 ± 0.15*
13	Alb (g/dL)	3.42 ± 0.01	2.85 ± 0.09*
14	BUN (mg/dL)	15.2 ± 0.12	15.79 ± 0.82
15	Cr (mg/dL)	1.22 ± 0.24	1.32 ± 0.07
16	Na (mEq/L)	138.82 ± 0.54	140.83 ± 0.87*
17	K (mEq/L)	4.02 ± 0.24	3.86 ± 0.14
18	Cl (mEq/L)	103.78 ± 0.25	103.36 ± 1.61

* and ** denote significant different values at $p<0.05$ and $p<0.01$ respectively

of little help in diagnosis, but it could be used to investigate potential concurrent diseases. Gupta *et al.* (2005) reported low levels of Hb, TEC and total protein in CHF affected dogs. De Morias (2000) and Ristic (2004) stated that in CHF patients routine biochemical parameters may remain within the normal range except for an elevation in the enzymatic activities of LDH and CKMB. Mild hypoprotenaemia and hypoalbuminaemia in the affected dogs could be attributed to increased protein loss from the intestines due to bowel and pancreatic edema and poor absorption due to decreased splanchnic perfusion (Ettinger, 2000). Exercise intolerance and dyspnoea at rest with elevated levels of CKMB and LDH may be suggestive of CHF in dogs.

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Outbreak of Peste des petits ruminants in goats in Puducherry

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Abstract

An outbreak of PPR was noticed in three flocks of goats in Pillayarkuppam (Puducherry) where affected goats revealed anorexia, high fever (40º – 41.2ºC), diarrhoea, bilateral nasal serous discharge, ulcers over the tongue, gums and lips and encrustation around nares and muzzle. The disease was confirmed by RT-PCR and affected animals were treated with enrofloxacin (@ 5 mg/kg, im for 3 - 5 days) and applied boroglycerine paste on the oral lesions.

Keywords: : Goat, PPR, Treatment.

Pest des petits ruminants (PPR) is an economically important viral disease of goats and less commonly of sheep, first described by Gargadennec and Lalane (1942) from Ivory cost in West Africa. It was first reported in 1987 from Tamil Nadu in India (Shaila *et al.*,1989) and for several years, the disease was thought to be restricted to southern India only. However after 1994, many PPR outbreaks were reported from northern states and West Bengal. The disease is highly contagious causing varying degrees of morbidity and mortality in susceptible animals. This paper reports the occurrence of PPR in Puducherry.

The outbreak was noticed in three flocks of goats in Pillayarkuppam (Puducherry). It was introduced into the farm by newly purchased goats from neighbouring state of Tamil Nadu. The case fatality rate was 63.3%. The affected goats revealed anorexia, high fever (40º – 41.2ºC), diarrhoea, bilateral nasal serous discharge, ulcers over the tongue, alveolar border of gums and lips and encrustation around nares and muzzle. Similar lesions were also reported by Singh *et al.* (1999). The ocular, nasal swabs and oral mucous membrane from affected goats were pooled and subjected to RT – PCR assay for confirmation of PPRV. The RT – PCR has been shown to be useful for the rapid detection of morbillivirus-specific RNA in the samples (Shaila *et al.*, 1996). The serum samples from seven affected goats collected two weeks after the appearance of symptoms were confirmed positive for PPRV antibodies by Dot - ELISA using recombinant 'N' protein.

The affected animals were treated with inj. enrofloxacin @ 5 mg/kg b wt, im for 3 - 5 days and boroglycerine paste was applied on the oral lesions for 5 to 7 days. Mortality occurred in 29% of adult goats and 82% of young ones as reported by Majumder (1997) also.

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Trypanosomiasis in buffalo and its clinical management

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Abstract

Trypanosomiasis, one of the most important hemoprotozoan diseases has been screened and 10 buffaloes were found positive. All the cases treated after specific examination with blood for getting better therapeutic efficacy.

Keywords: Buffalo, Trypanosomiasis, Management.

Trypanosomiasis is one of the important haemoprotozoan diseases which causes a variety of symptoms in buffaloes. It is caused by *Trypanosoma* spp. The disease is widely distributed in tropical & subtropical countries. The incidence of the disease, however, varies depending on vector, availability of host and/ or climatic condition. For instance, an incidence of 0-61% in calves (Otte *et al.,* 1988) being higher in wet season, 44.4% in adult dairy cattle in NewYork, USA (Schlafer, 1979), 26% cattle in Iran (Niak, 1978), 3.1% in cattle in North Coast of Colombia and 2.69% in buffaloes in India (Laha *et al.,* 1989). In India, the diseases has been recorded from all the states, (Gill, 1977). The present study reports case of trypanosomiosis in buffalo and its treatment.

A total of 10 buffaloes of 1.5-7 years age group were from surrounding villages found positive for Trypanosomiasis on the basis of clinical & blood sample examination. Blood smears of the suspected animals stained with Giemsa (MAFF, 1986) were examined microscopically. Trypansomes were identified in the blood smears based on their morphology as described previously (Soulsby, 1982).

Symptoms of all positive cases were not the same. Three animal had history of progressive loss of body weight, anaemia, poor appetite and muco-purulent discharge from the eyes. The animals had body temparature more or less normal and weakness on hind limb. Three animals had history ofprogessive loss of body weight, anaemia, anorexia, wet muzzle & frequent urination. The body temparatureof these animals were 100° F and unable to stand. Two animals had symtom like increase in body temparature (104° F), congestion of conjunctival mucous membrane, erection of hairs, anorexia and history reflected that they did not respond to atibiotic and supporting therapy. One animal showed blindness, incordination in hind quarter along with body temparature (104° F) & complete anorexia. One animal had history of progressive weakness, anaemia and remittent fever. Body temparature at morning (99° F) and at evening (103° F).

All clinical cases were treated with drug of choice for Trypanosomiasis in buffaloes name Quinapyramine sulphate & chloride (Zokil injection. Vet Man kind Pharmaceutical Ltd.) @ of 4.2 mg/kg body weight S/C route. This drug was effective against *Trypanosoma brncei, T. evansi, T. congolense & T. simiae* in cattle (Radostits *et al.,* 2007). This drug is choice of drug in cases of Trypanosomiasis in buffaloes (Bhonsle *et al.,* 2005). Fluid & electrolyte therapy (Intalyte injection, Intas Pharmaceuticals Ltd.) was given @ 1 litre/head by I/V route for 3 days for the compensation of fluid & electrolyte loss in animals who showed progressive weakness. Fluid & electrolyte therapy also hastens the recovery process. Injection of iron sorbitol citric acid (Feritas injection, Intas Pharmaceuticals Ltd.) was given @ 1 mV50 kg body weight by I/M route for 3 days in anaemic animals. Iron sorbitol citric acid compensates losses due to anaemia. The therapy were also adjuncted with injection of vitamin B complex (Trivet injection, Intas pharmaceuticals Ltd-) 10 ml/animal tone up body condition & regain normal apetite. Injection of meloxicem combined with lignocaine (Melonex power injection, Intas Pharmaceuticals Ltd.) 1 ml/100 kg Body weight in animals who showed elevated body temp. for 1-3 day depends upon to regain normal temp. All animals responded well & return to normal condition.

In conclusion, blood examination of all the suspected animals be carried out immediately in the situation like above to institute specific therapy instead of using nonspecific drugs. Qunapyramine compound

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along with supporative therapy can be tried in suspected cases at field condition, where blood examination facility is not avaialable & antibiotic or other therapy does not respond.

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A rare occurrence of dedifferentiated liposarcoma in an Angora rabbit

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Abstract

A case of liposarcoma in a 5 yr old Angora rabbit showed clinical signs of anorexia and enlarged abdomen and it died after 2 days of treatment and on post- mortem examination, a tumour mass of about 600 g was found in the abdominal cavity and by histopathology, the tumour was diagnosed as liposarcoma

Keywords: Angora rabbit, Liposarcoma

Liposarcoma in rabbit is very rare but some workers reported it in cattle (Suto *et al.*, 2007; Piercy *et al.*, 1994). It may occur wherever there is fat, but commonest in inter- muscular tissue around joints and in the retroperitoneal region and peri-renal regions (Yager and Scott, 1993).The present paper reports the liposarcoma in abdominal cavity of an Angora rabbit.

Dedifferentiated liposarcoma is characterized by a combination of well-differentiated liposarcoma and a non-lipogenic dedifferentiated sarcoma component. The term dedifferentiated usually indicates the abrupt transition from a low-grade neoplasm to a higher-grade tumour morphology mainly used for liposarcoma in analogy to findings in bone neoplasias (Dahlin and Beabout,1971).

An Angora rabbit aged about 5 yr and weighing 3 kg showed clinical signs of distended abdomen, off feed and diarrhoeic feces. It was treated with antibiotics for 2 days but the rabbit died. On post- mortem examination, a multi lobulated tumour mass weighing about 600g attached to mesentery (7 x 4 x 2.5 cm) was collected from the abdominal cavity (Fig 1). The tumour mass had a thick capsule and its cut surface was whitish pink, homogenous and little softer to moderately hard in consistency. The tumour was fixed in 10 % buffered formalin,embedded in paraffin wax, sectioned at 4 µm and stained with HE for histopathology.

Histological examination showed (Fig 2) malignant potency with biazarre multinucleated cells. The tumour consisted of sheets of neoplastic cells and tumor cells were arranged in a whorl pattern and characterized by areas of anaplasmic tissue and an intermediate tissue in which only rudimentary fat cells with very small vacuoles were present. These findings

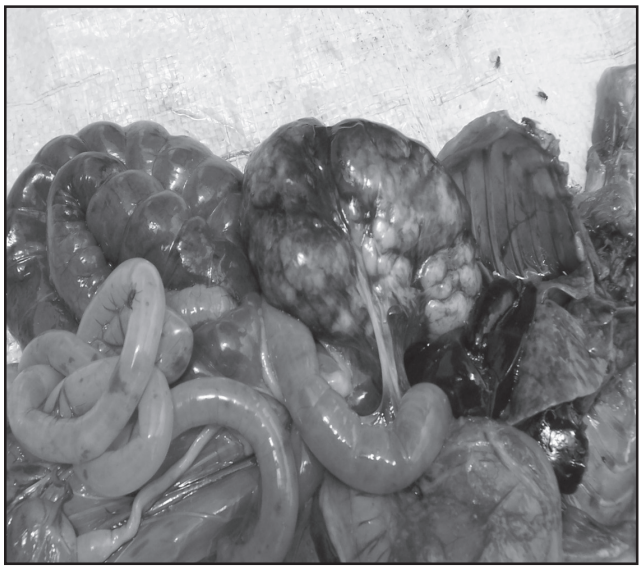

Fig 1. Multi lobulated tumor mass weighing about 600gms attached to mesentery

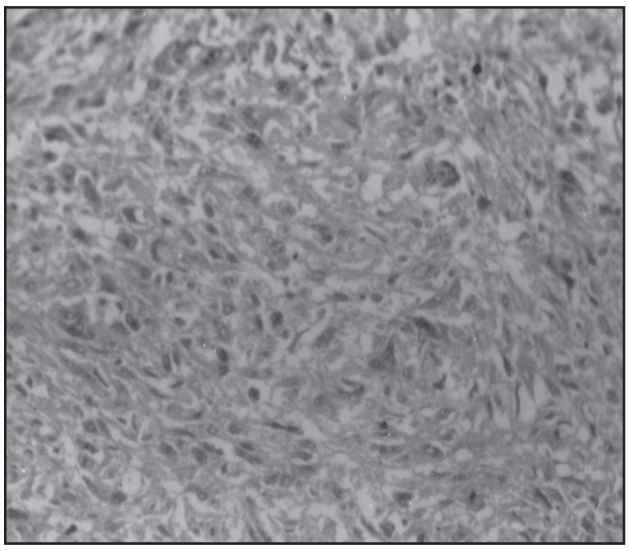

Fig 2. Sheets of neoplastic cells, tumor cells were arranged in a whorl pattern and characterized by areas of anaplasmic tissue (250x)

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were in agreement with Smith and Jones (1968). Fat globules of medium to large size were scattered throughout the tumor mass, peripheral nucleus was evident in few fat cells. These findings were in agreement with Evans (1968). Anisokaryosis with vesicular nucleus, hyperchromatism and double nuclei were prominently observed. Vascular congestion, haemorrhages and areas of necrosis indicated malignant potency of the tumor mass. Tumour giant cells with hyper chromatism were observed. The tumour areas were also composed of spindle shaped cells arranged in whorls, which indicated intermediate to high-grade differentiation. The whorls were clustered and also scattered throughout the tumors.

The tumour with whorls was completely separated by a thin strand of fibrin, which made it like Islands. The occurrence of dedifferentiated liposarcoma as in this case reported here appears to be more unique.

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