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Biochemico-haematological profile in mange infested pigs

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Abstract

The present study was carried out on twelve (12) pigs naturally suffering from mange and compared to six (6) normal healthy pigs. The pigs were divided into three groups consisting of six pigs in each, viz. group-I, group-II and group-III respectively. The infested animals in group-I and group-II were treated with injections of Doramectin and Ivermectin respectively whereas Group-III comprising of normal healthy pigs was kept as control group throughout the duration of study upto 30th day post treatment. Studies revealed that Hb, PCV, TEC levels showed significantly decreased levels while TLC and eosinophils had significantly higher levels in infested pigs when compared with those of healthy pigs which returned to normal levels after treatment. Biochemical studies revealed significantly elevated serum levels of AST, ALT and Cortisol and lowered levels of Total protein and Albumin in infested pigs when compared with that of healthy pigs which also returned to normal level after treatment.

Keywords: Biochemico-haematological, pigs, mange

Introduction

Mange in pigs is a severe disease as it requires repetition of treatment leading to increased expenses. Mange causes high morbidity with widespread lesions leading to emaciation, weakness, and other secondary infections complicating to other skin disorders (Bornstein, 2004) [1]. Circumstantial evidence shows that mange has a negative effect on growth rate, feed conversion of weaners and fattening pigs resulting in poor economic return (Penny and Muirhead, 1986) [8]. Damage to equipments and pen structure due continuous scratching by pigs may lead to higher expenses (Melancon *et al.*, 2002) [5]. The haematological parameters included were Hb, PCV, TEC, TLC, and DLC while serum biochemical values for total protein, albumin, globulin, AST, ALT and Cortisol were also studied to evaluate the effects of different therapeutic regimes.

Material and Methods

The present study was carried out on twelve (12) pigs naturally suffering from mange and compared to six (6) normal healthy pigs. The pigs were divided into three groups consisting of six pigs in each group, viz. group-I, group-II and group-III respectively. The infested animals in group-I and group-II were treated with injections of Doramectin and Ivermectin respectively whereas Group-III comprising of normal healthy pigs was kept as control group throughout the duration of study upto 30th day. Biochemico-haematological parameters included Hb, PCV, TEC, TLC, DLC, Total protein, Albumin, Globulin, AST, ALT and serum Cortisol which were recorded on day '0', 15th and 30th day post treatment. All haematological tests were done following as per standard procedure (Jain *et al.* 1986). All serum parameters were assessed by spectrophotometry with atomic biochemical analyzer using kits supplied by Erba Diagnostics. Serum cortisol was estimated by standard ELISA method using kit supplied by Enzo Lifesciences.

Statistical data was analyzed using analysis of variance Completely Randomized Design (Snedecor and Cochran, 1994) [10] for noting the changes in Biochemico-haematological changes before and after treatments in group-I and group-II compared to normal values.

Result and Discussion

Haematological studies revealed significant increase in the mean values of haemoglobin, packed cell volume and total erythrocyte count in both treatment groups after treatment. Significant decrease in total leucocyte count in group-I was observed after treatment.

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The mean eosinophil count was also significantly decreased in both group-I and group-II after treatment (Table 1 & 2).

The decreased in mean levels of haemoglobin, packed cell volume, total erythrocyte count and increased total leucocyte count in both groups before treatment were restored to near normal after therapy. Reduced levels may be due to sucking of blood and tissue fluids by mites causing nutrient deficiency and malnutrition which are in agreement with findings recorded by Sinha *et al.* (2004) [9], Kumar *et al.* (2007) [4], Minj *et al.* (2012) [6] and Gupta *et al.* (2013a) [2]. Leucocytosis before treatment may have been due to secondary bacterial infection or allergic reaction caused by harmful products of mites which are in accordance to those recorded by Opara *et al.* (2007) [7], Minj *et al.* (2012) [6] and Gupta *et al.* (2013a) [2]. Differential leucocyte count revealed neutrophillia, lymphopaenia and eosinophilia before treatment which came to near normal post treatment. The reasons for above alterations may be due dermatitis and allergic reaction of skin with accumulation of lymphocytes at affected sites, higher level of neutrophils in circulation and hypersensitivity with increased eosinophils. The findings were similar to those observed by Gupta *et al.* (2013a) [2].

Estimation of biochemical values of serum total protein and

albumin showed highly significant increase and there was decrease in aspartate amino-transferase (AST) and alanine amino-transferase (ALT) after treatment in mange infected pigs. The values of serum cortisol decreased significantly in group-I as compared to group-II (Table 3).

The decreased values of serum total protein and albumin and increased levels in aspartate amino-transferase (AST), alanine amino-transferase (ALT) and serum cortisol before treatment returned to normal after treatment. Reduced levels of serum total protein and albumin may be due to malnutrition caused due to loss of tissue proteins. Similar results were found by Kumar *et al.* (2007) [4] and Minj *et al.* (2012) [6]. Higher serum globulin level after treatment can be attributed to increase in immunoglobulin level indicating general improvement in immunity against secondary bacterial infection.

Increased in levels of serum ALT were similar to those observed by Sinha *et al.* (2004) [9]. Serum AST also showed increased levels. Elevated levels in serum AST & ALT might be due to neutralization of mite toxins in liver. Increase in serum cortisol level might be due to constant pruritis, biting and scratching of body parts leading to increased stress levels before treatment. Similar findings were reported by Wooten Saadi *et al.* (1988) [11].

Table 1: Haematological observations in treatment and control groups

Parameters	Day	Group – I (Doramectin treated)	Group – II (Ivermectin treated)	Group – III (Control)
Hb(g/dl)	Day '0'	10.37 ± 0.04 ^c	10.29 ± 0.02 ^c	12.63 ± 0.10 ^{ns}
	15 th day	11.82 ± 0.05 ^{bm}	10.86 ± 0.11 ^{bn}	12.80 ± 0.15 ^{ns}
	30 th day	12.46 ± 0.15 ^{am}	11.57 ± 0.17 ^{an}	12.68 ± 0.10 ^{ns}
PCV (%)	Day '0'	30.50 ± 0.69 ^c	29.17 ± 0.61 ^c	38.00 ± 0.74 ^{ns}
	15 th day	34.19 ± 0.34 ^b	32.89 ± 0.51 ^b	38.50 ± 0.74 ^{ns}
	30 th day	38.17 ± 0.40 ^{am}	36.72 ± 0.64 ^{an}	38.67 ± 0.74 ^{ns}
TEC (x10 ⁶ /μL)	Day '0'	5.62 ± 0.46 ^c	5.65 ± 0.12 ^b	6.93 ± 0.13 ^{ns}
	15 th day	6.00 ± 0.08 ^{bm}	5.71 ± 0.04 ^{bn}	6.87 ± 0.13 ^{ns}
	30 th day	6.66 ± 0.15 ^{am}	6.17 ± 0.11 ^{an}	6.97 ± 0.13 ^{ns}
TLC (x 10 ³ /μL)	Day '0'	16.67 ± 0.25 ^a	16.38 ± 0.38 ^a	15.03 ± 0.24 ^{ns}
	15 th day	15.55 ± 0.13 ^b	15.71 ± 0.07 ^a	14.97 ± 0.24 ^{ns}
	30 th day	15.03 ± 0.12 ^c	15.49 ± 0.27 ^a	14.93 ± 0.24 ^{ns}

a, b, c – superscripts for comparison within groups

m, n – superscripts for comparison between groups

ns – non- significant

Table 2: Differential Leucocyte Count in treatment and control groups.

Parameter	Day	DLC (%)				
		N	L	M	E	B
Group – I (Doramectin)	Day '0'	51.33 ± 0.68 ^a	41.00 ± 0.46 ^c	2.17 ± 0.20 ^a	5.17 ± 0.17 ^a	0.33 ± 0.09 ^a
	15 th day	48.67 ± 0.73 ^b	44.67 ± 0.61 ^b	2.17 ± 0.28 ^a	3.50 ± 0.20 ^{bm}	0.33 ± 0.19 ^a
	30 th day	46.00 ± 0.33 ^c	48.00 ± 0.53 ^a	2.00 ± 0.33 ^a	3.17 ± 0.28 ^b	0.17 ± 0.15 ^a
Group – II (Ivermectin)	Day '0'	51.00 ± 0.46 ^a	41.17 ± 0.59 ^c	2.33 ± 0.25 ^a	5.00 ± 0.24 ^a	0.50 ± 0.07 ^a
	15 th day	49.83 ± 0.44 ^a	44.50 ± 0.51 ^b	2.00 ± 0.33 ^a	4.50 ± 0.20 ^{abn}	0.17 ± 0.15 ^a
	30 th day	46.83 ± 0.55 ^b	47.50 ± 0.46 ^a	2.17 ± 0.28 ^a	3.67 ± 0.19 ^b	0.33 ± 0.19 ^a
Group – III (Healthy Control)	Day '0'	45.17 ± 0.77 ^{ns}	47.50 ± 0.81 ^{ns}	2.50 ± 0.19 ^{ns}	3.83 ± 0.13 ^{ns}	0.33 ± 0.09 ^{ns}
	15 th day	44.83 ± 0.77 ^{ns}	47.83 ± 0.81 ^{ns}	2.67 ± 0.19 ^{ns}	3.67 ± 0.13 ^{ns}	0.33 ± 0.09 ^{ns}
	30 th day	45.00 ± 0.77 ^{ns}	47.67 ± 0.81 ^{ns}	2.67 ± 0.19 ^{ns}	3.50 ± 0.13 ^{ns}	0.33 ± 0.09 ^{ns}

a, b, c – superscripts for comparison within group

m, n – superscripts for comparison between groups

ns – non-significant

Table 3: Serum biochemical values in treatment and control groups.

Group	Day	Serum Parameters					
		Total protein(g/dl)	Albumin(g/dl)	Globulin(g/dl)	AST(U/L)	ALT(U/L)	Cortisol(μg/dl)
Group – I (Doramectin)	Day '0'	6.42 ± 0.04 ^c	2.50 ± 0.69 ^b	3.93 ± 0.46 ^a	80.48 ± 0.25 ^a	56.32 ± 0.68 ^a	2.70 ± 0.00 ^a
	15 th day	6.80 ± 0.05 ^b	2.90 ± 0.12 ^a	3.90 ± 0.15 ^a	75.62 ± 0.47 ^b	50.65 ± 0.46 ^b	2.61 ± 0.01 ^b
	30 th day	7.22 ± 0.04 ^a	3.18 ± 0.07 ^{am}	4.04 ± 0.04 ^a	72.85 ± 0.24 ^{cm}	46.90 ± 0.37 ^c	2.60 ± 0.02 ^b
Group – II	Day '0'	6.17 ± 0.12 ^c	2.32 ± 0.17 ^b	3.85 ± 0.20 ^a	80.50 ± 1.06 ^a	56.27 ± 0.83 ^a	2.72 ± 0.02 ^a

(Ivermectin)	15 th day	6.64 ± 0.06 ^b	2.59 ± 0.12 ^{ab}	4.05 ± 0.17 ^a	77.22 ± 0.64 ^b	51.88 ± 0.49 ^b	2.63 ± 0.01 ^a
	30 th day	7.23 ± 0.15 ^a	2.96 ± 0.05 ^{an}	4.26 ± 0.19 ^a	74.43 ± 0.23 ^{cn}	48.00 ± 0.48 ^c	2.64 ± 0.05 ^a
Group – III (Control)	Day '0'	7.16 ± 0.07 ^{ns}	3.37 ± 0.2 ^{ns}	3.79 ± 0.23 ^{ns}	72.15 ± 0.68 ^{ns}	49.30 ± 1.36 ^{ns}	2.62 ± 0.02 ^{ns}
	15 th day	7.19 ± 0.07 ^{ns}	3.40 ± 0.21 ^{ns}	3.79 ± 0.25 ^{ns}	72.83 ± 0.78 ^{ns}	48.80 ± 1.00 ^{ns}	2.60 ± 0.02 ^{ns}
	30 th day	7.24 ± 0.03 ^{ns}	3.53 ± 0.10 ^{ns}	3.70 ± 0.13 ^{ns}	73.33 ± 0.88 ^{ns}	48.23 ± 1.02 ^{ns}	2.59 ± 0.02 ^{ns}

a, b, c – superscripts for comparison within groups

m, n – superscripts for comparison between groups

ns – non- significant

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