



COMPARATIVE CLINICAL PATHOLOGY OF JOHNIN AND TUBERCULIN REACTORS OF BOVINES

Johnes disease and tuberculosis are important mycobacterial diseases that cause economic losses due to emaciation and death besides decreased productivity, increased infertility and susceptibility to other infections. Both diseases have long incubation period manifesting subclinical infection leading to asymptomatic carriers shedding the bacilli throughout their lives or some with clinical disease. In order to avoid spreading of disease among different farm animals, it is necessary to employ periodic screening tests to detect the reactors, segregation and rapid disposal of reactors. This paper reports on the haematology and biochemical parameters of Johnin and Tuberculin bovine reactors.

One hundred and twenty one cattle above six months of age in an organised dairy farm were subjected to comparative intradermal tests using Johnin PPD and Tuberculin PPD. Preparation of animals for tests and test procedures and recording of results were done as per instructions issued

by the B.P. Division of IVRI, Izatnagar, on use of Johnin and tuberculin PPD. Eight johnin reactors and eleven tuberculin reactors were kept segregated and served as the experimental group and another six johnin and tuberculin negative clinically healthy cows served as control. Blood was collected from both experimental and control groups for hematology and serum for biochemical estimation. Erythrocyte sedimentation rate (ESR) and differential leucocyte count (DLC) were estimated using Wintrob's method (Benjamin, 1985). Packed cell volume (PCV), haemoglobin (Hb), total erythrocyte counts (TEC) and total leukocyte counts (TLC) were determined as per Coles (1986). The serum profile of calcium (Ca), magnesium (Mg), iron (Fe), zinc (Zn) and copper were estimated using atomic absorption spectrophotometer (Perkin Elmer 3110). The data obtained were analysed statistically as per the method described by Snedecor and Cochran (1980).

Table 1. Haematological parameters of johnin and tuberculin reactors in comparison to control

Serial Number	Parameters	Johnin reactors (8)	Control (6)	Tuberculin reactors (11)
1	ESR (mm/24 hr)	13.5 ± 1.5*	5.67 ± 1.73	16.14 ± 1.60*
2	PCV (%)	27.25 ± 1.01*	33.63 ± 1.23	24.50 ± 1.01*
3	Hb (g/dl)	10.90 ± 0.21	12.53 ± 0.24	11.09 ± 0.22
4	TEC (x10 ⁶ /ml)	4.92 ± 0.31*	7.30 ± 0.36	4.78 ± 0.33*
5	TLC (x10 ³ /ml)	11.34 ± 0.27*	10.48 ± 0.32	11.49 ± 0.29*
6	Lymphocyte (%)	81.63 ± 1.31*	72.83 ± 1.51	81.29 ± 1.4*
7	Neutrophil (%)	12.88 ± 1.52*	23.33 ± 1.75	14.00 ± 1.62*
8	Monocyte (%)	1.63 ± 0.41*	3.00 ± 0.48	1.86 ± 0.44
9	Eosinophil (%)	3.88 ± 0.70*	0.83 ± 0.81	2.86 ± 0.75

* P<0.1

Table 2. Biochemical parameters of johnin and tuberculin reactors in comparison to control

Serial Number	Parameters	Johnin reactors (8)	Control (6)	Tuberculin reactors (11)
1	Ca (mg%)	6.98 ± 0.45*	8.91 ± 0.82	7.33 ± 0.28*
2	Mg (mg%)	3.14 ± 0.39	2.32 ± 0.1	2.62 ± 0.18
3	Fe (ppm)	1.50 ± 0.37	1.44 ± 0.10	0.85 ± 0.19*
4	Cu (ppm)	0.70 ± 0.04	0.72 ± 0.04	0.73 ± 0.08
5	Zn (ppm)	1.31 ± 0.16	1.72 ± 0.04	1.75 ± 0.31

* P<0.1

Out of the one twenty one cattle subjected to comparative intradermal test. Eight animals (6.61%) were found to be johnin reactors and eleven animals were found to be tuberculin reactors. All the reactors were above four years of age confirming mycobacterial diseases as an old age disease. Reactors showed signs of emaciation, dehydration, alopecia, rough hair coat and faded colour. On statistical analysis it was observed that the PCV, TEC and neutrophil counts were significantly decreased whereas ESR, TLC and lymphocyte counts were significantly increased in both cases compared to control (Table 1). Significant decrease in PCV, TEC and decrease in haemoglobin observed in both experimental groups can be attributed to the poor health status and anemia. Low level of PCV, TLC and Hb in tuberculin reactors are in agreement with Samad and Rahman (1986), Prasad *et al.*, (1996) and Mahato *et al.*, (2001). The significant increase in the ESR in the affected group may be either arising from anaemia in which ESR is increased due to small number of cells which settle more easily in large volume of the fluid or due to alteration in plasma protein (Benjamin, 1985). The increase in lymphocyte count might be a result of chronic infection that caused immunomodulation with abundant increase in T- lymphocyte level. Samad and Rahman (1986) also reported increase in lymphocyte per cent and comparative fall in neutrophil count on DLC in tuberculous animals as significant which they attributed to chronic and wasting nature of the disease. Decrease in the number of monocytes in both groups may be indicative of migration of circulatory monocytes to affected tissues for performing the mycobactericidal function and transformation into epithelioid cells. Higher eosinophil count

in johnin reactors is suggestive of an ongoing hypersensitivity state in the course of the diseases.

Among the five minerals estimated in the serum (namely Ca, Mg, Fe, Cu and Zn) low value obtained only for Ca in both reactors (Table 2). Low serum level of Fe was also observed in tuberculin reactors. This low level of Fe is due to the iron chelating action of mycobactin which will lead to iron deficiency anaemia where the sequential changes described in the development are iron depletion, iron deficient erythropoiesis and an established iron deficiency (Jubb *et al.*, 1984). Other biochemical values estimated in both reactors were comparable with that of normal animals.

The comparative analysis of Johnin and Tuberculin reactors with regard to haematological and biochemical values did not show any statistical difference.

Summary

Comparative intradermal test was done in an organised dairy farm to detect Johnin and Tuberculin positive reactors. Hematological and biochemical parameters of the reactors were compared with healthy animals. Haematological studies of Johnin and Tuberculin reactors of bovines revealed reduction in the values of packed cell volume, total erythrocyte count and an increase in the erythrocyte sedimentation rate and total leucocyte count. Biochemical parameters showed a decrease in the serum iron content of tuberculin reactors. Comparative clinical pathology related to hematological and biochemical, parameters of both reactors are described.

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