Journal of Veterinary and Animal Sciences. 25 (1994) 50-52

TOXICOLOGICAL EFFECTS OF A COMBINATION OF NITROFURAZONE AND FURAZOLIDONE IN RABBITS

N. Vijayan and A. Rajan
Centre of Excellence in Pathology,
College of Veterinary and Animal Sciences, Mannuthy, Thrissur 680 651.

Nitrofurazone and furazolidone are used as anticoccidial drugs, sometimes in combination with vitamin A and K. This combination is mainly prescribed for use in poultry. But occasionally, this combination is also tried in other species, when other anticoccidial drugs are not available or when the available drugs are found to be not effective. In one such occasion, in an organised goat farm, when the kids were treated with the above combination, heavy mortality occured subsequent to development of nervous symptoms.

An experimental study was therefore undertaken to assess the toxicological effect of a combination of nitrofurazone and furazolidone taking rabbit as an experimental model.

Materials and methods

Six healthy adult rabbits were randomly selected for the study and maintained on standard rabbit feed. The weight of the individual rabbits were recorded on the first, third and seventh days.

Two groups A and B consisting of two rabbits each were administered the furazolidone-nitrofurazone combination at the rate of 100 mg and 150 mg per Kg. of body weight for 7 days respectively. The group C, consisting of two rabbits served as the control. Blood Urea Nitrogen (BUN) was estimated before and after the treatment by the method described by Benjamin (1979). Van den Berg test was also conducted before the commencement and after the experiment as described by Sastry (1985).

The clinical symptoms manifested during the course of the experiment were observed and recorded. The rabbits which withstood the treatment were sacrificed on the 7th day and the rabbits which succumbed to the treatment were subjected to detailed post mortem examination and the gross lesions recorded. Pieces of the liver, heart, kidney and brain were collected in 10% neutral buffered formalin for histopathologic studies. The sections were stained with routine Haematoxylin and Eosin stain.

Results and discussion

The rabbits of the treatment group became dull on the first day itself and showed reduction in the feed intake. The group which was administered the higher level of treatment developed dullness, weakness and ataxia from the third day onwards.

Dose dependent reduction in the body weight as shown in table 1, can be attributed to the inappentance. This is in agreement with the reports of Koeda *et al.* (1979) in guinea pigs and Borland (1979) in cows.

The liver of the rabbits of the experimental group was engorged and the borders were rounded. The gall bladder was distended. The kidney was enlarged, congested and showed slightly granular surface. Linear whitish streaks were seen in the cortex. The gross changes varied in intensity with the increase in dosage.

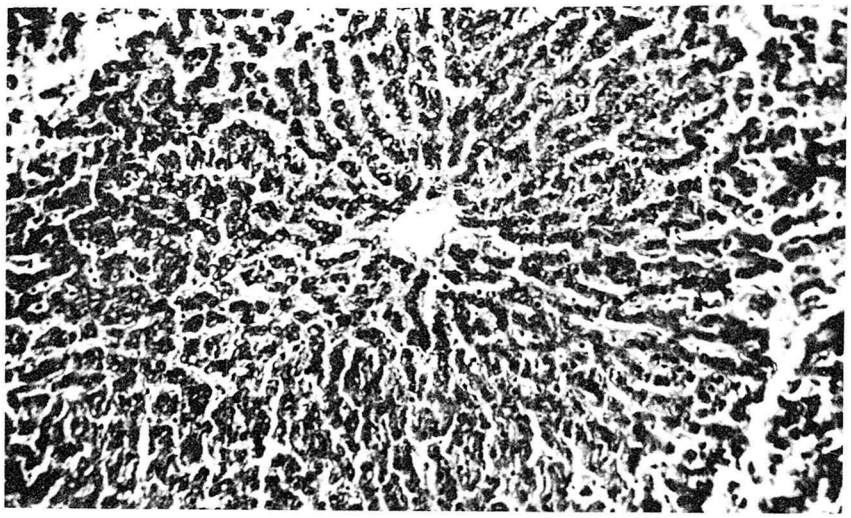

Fig. 1 The microscopic sections of liver revealed severe degree of centrilobular fatty change

Table 1 Body weights on day I, III and VII

Group	Day I (kg)	Day III (kg)	Day VII (kg)
A	2.800	2.600	2.300
(150 mg/kg)	2.500	2.300	Died
B	2.800	2.700	2.300
(100 mg/kg)	2.600	2.500	2.450
C	2.600	2.600	2.650
(Control)	2.800	2.800	2.800

The microscopic sections of liver revealed severe degree of centrilobular fatty change (Fig. 1). The central vein was engorged. The renal tubules contained degenerated desquamated tubular epithelial cells and casts. The tubular epithelial cells showed granular degenerative changes. The cells were swollen and projected into the lumen and narrowed the tubules. The glomerular capillaries were engorged. The Bowman's space contained pinkish oedematous fluid. The cerebrum revealed focal areas of oedema. The neurons were pyknotic. The capillaries were slightly engorged. The kidney, liver and the brain from the control group did not reveal any significant histopathologic changes.

Van den Berg test was negative before the experiment, but showed biphasic reaction in both the treated groups after the treatment indicative of the hepatic damage as noticed on the post mortem and histopathological examination. The extent of renal damage is supported by the observation of enhanced BUN level after the treatment (Table 2).

Table 2 BUN level before and after the experiment

Group	Before the experiment mg/dl	7th day mg/dl
A 1	20.0	56.07
2	1.8	Died
B 1	22.0	41.12
2	20.5	37.30
C 1	18.0	22.42
2	20.0	28.00

Summary

A combination of nitrofurazone and furazolidone were administered to rabbits at the rate of 100 mg./kg and 150 mg./kg body weight. There was a dose dependent reduction in the body weight. It was found to be nephrotoxic and hepatotoxic both clinically and pathologically.

References

1. Benjamin, M.M. (1979). Outline of Veterinary Clinical Pathology, The Iowa state University Press, 3rd ed. pp 235-236.

2. Borland, E.D. (1979). An incidence of suspected furazolidone toxicity in pigs. Vet. Rec, 105-169.

3. Koeda, T., Sasaki, N., Kohanana, M. and Kounon, S. (1976). Acute toxicity of furazolidone for guinea pigs. Ann. rep. Nat. Vet. Assay. Lab. **13**: 23-32 cited in Ali, B.H. (1983). Some pharmacological and toxicological properties of furazolidone. Vet. Res. Communications **6**(1): 1-1

4. Sastry, G.A. (1985). Veterinary Clinical Pathology. CBS Publishers & Distributors, New Delhi. 3rd Ed. pp 47.