

SHORT COMMUNICATION

DISTRIBUTION OF SULFISOMIDINE IN TISSUES OF POULTRY

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Summary: The biological half life, blood level and tissue dispersion of sulfisomidine in poultry have been studied. The biological half life was observed to be 40 minutes. Following single dose (275 mg/kg) oral administration, the peak blood level of 13.92 mg% was found at 2 hr and the liver and small intestine showed highest drug residue at the end of 24 hr.

Key words: sulfisomidine distribution biological half life

INTRODUCTION

Information on the pharmacokinetic parameters of sulfisomidine in poultry is not available. This investigation was taken up to find out the blood level, tissue distribution and biological half life of the drug.

MATERIALS AND METHODS

Two groups, each consisting of five parasite free, healthy, one year old birds weighing between 1.0 to 1.5 kg were used in this study. The birds were maintained under a standard ration schedule.

Each bird of the two groups was given sulfisomidine (Elkosine (R)) orally in a dose of 275 mg/kg body weight. Blood samples were collected at 2 hr, 6 hr, 12 hr and 24 hr from the birds of groups I and II and at 48 hr from the birds of group II. The birds of the groups I and II were sacrificed at 24 hr and 48 hr respectively and organ samples collected.

The concentration of the free drug in the blood and organs was determined by the Bratton and Marshall (3) Colorimetric method.

The biological half life was determined after i.v. administration of the drug in birds in a dose of 20 mg/kg body weight. Blood samples were collected at 20 min, 40 min, 60 min, and 90 min intervals. Drug concentrations in the blood samples were plotted against their time of collection on a semilog paper. The zero time concentration of the drug in blood was obtained by extrapolating the line back to zero time. The biological half life of a drug is the time in which the zero time concentration becomes half.

RESULTS AND DISCUSSION

The mean peak blood levels at 2 hr, 6 hr, 12 hr, 24 hr and 48 hr were 13.92 ± 1.32 , 8.35 ± 0.71 , 6.48 ± 0.77 , 1.55 ± 0.37 and 0.74 ± 0.04 mg% respectively. The biological half life of the drug was found to be 40 min after i.v. administration. The results indicated that therapeutically active free drug concentration of 6.48 ± 0.77 mg% was available in the blood till 12 hr post oral administration of a single therapeutic dose and required to be repeated at 12 hr intervals, since 5 mg% level is usually taken as the minimum effective concentration (4). The duration of action of sulfisomidine in poultry was found to range between sulfaquinoxaline and sulfamoxole in relation to its blood level (1,2). Thus, systemic clinical use of sulfisomidine in poultry is possible.

The tissue distribution of the drug is depicted in Table I. The results of the tissue distribution showed that sulfisomidine concentration in the small intestine was the highest among all the other tissues and organs of poultry except the liver at 24 hr. Further, the intestinal concentration of sulfisomidine was higher than that of sulfaquinoxaline at 24 hr (1). This may indicate a possible use of this drug in intestinal infections with coccidia which is a problem for poultry industry in this country. The coccidiostatic action of sulfisomidine remains to be studied. The liver concentration of the drug at 24 hr and 48 hr showed a very slow rate of disappearance from the tissue storage which possibly indicated a slower rate of liver detoxication of the drug structure. Further, the short biological half life of 40 min obtained with this drug may have contributed to its fair tissue dispersion and localization.

TABLE I: Concentration of free sulfisomidine in tissues of poultry sacrificed at 24 hr and 48 hr after administration of a single oral dose of 275 mg/kg.

Mean drug concentration (mg%) \pm S.E.

Organ	24 hr	48 hr
Brain	0.33 ± 0.04 (5)	0.23 ± 0.002 (3)
Kidney	1.07 ± 0.15 (5)	0.44 ± 0.04 (4)
Lung	0.52 ± 0.04 (5)	0.40 ± 0.10 (5)
Liver	1.32 ± 0.08 (5)	1.13 ± 0.09 (5)
Spleen	1.00 ± 0.07 (4)	0.49 ± 0.06 (4)
Yolk	0.50 ± 0.09 (4)	0.36 ± 0.09 (4)
Muscle	0.49 ± 0.05 (5)	0.32 ± 0.06 (5)
Caecum	0.91 ± 0.36 (5)	0.44 ± 0.07 (5)
Small Intestine	1.25 ± 0.14 (5)	0.40 ± 0.04 (4)

Figures in parentheses indicate the number of observations.

The study showed that fair amounts of the drug was present in the yolk and muscle both at 24 hr and 48 hr post single dose oral administration. This suggests that the sale of birds and eggs for table purpose should be prohibited at least for 10-15 days after the last dose was given. Righter *et al.* (5) observed that withdrawal of sulfaquinoxaline for seven days reduces the drug residual concentration in body tissues to one part per million. This restriction was necessary to avoid allergic and hypersensitive reactions in sulfonamide sensitive individuals. The importance of this prohibition has been discussed by Banerjee *et al.* (1,2).

ACKNOWLEDGEMENTS

The authors are thankful to Dr. R.N. Singh, Principal for taking keen interest in the work and also for providing necessary facilities.

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