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Inefficacy of Oral Ketamine for Chemical Restraint in Turkeys

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ABSTRACT: Ketamine hydrochloride was given orally at a dose of 200 mg/kg to six domestic turkeys (*Meleagris gallapovo*). There was no apparent anesthetic effect. The same birds received 500 mg/kg by the same route 1 wk later. All birds became ataxic within 10 min; although some sedation was apparent, they made coordinated escapes when challenged.

Key words: Ketamine hydrochloride, anesthesia, domestic turkey, *Meleagris gallapovo*, oral administration, wildlife model, experimental study.

Ketamine hydrochloride is a dissociative anesthetic of the cyclohexanone series that has been recommended for the chemical restraint of a variety of avian species (Sanford, 1971; Boener and Wright, 1975; Redig and Duke, 1976; Altman, 1980). Dose recommendations vary because the efficacy of the drug is influenced by several factors including species and individual-related biological variation, the route of administration and environmental stress (Hartsfield and McGrath, 1986). In chickens, the median effective dose (ED_{50}) and median lethal dose (LD_{50}) for intravenous ketamine were found to be 14 mg/kg and 67.9 mg/kg, respectively (McGrath et al., 1984), but the effects of the drug given orally remains uninvestigated. Ebedes (1973) used another cyclohexanone, phencyclidine, to kill zebras (*Equus burchelli antiquorum*) which were then used as bait to capture vultures (*Gyps coprotheres*), white-backed vultures (*G. africanus*) and black vultures (*Torgos tracheliotis*). The technique was successful; a total of 67 vultures were captured and with one exception, all birds survived and were released. The efficacy of oral cyclohexanones in mammals is variable. The author has successfully restrained caged raccoons (*Procyon lotor*) by squirting ketamine, via syringe, into the oral cavity, but black-backed jackals (*Canis mesomelas*) and lions (*Panthera leo*) were not affected after eating phencyclidine-baited zebra meat (Ebedes, 1973). The study reported here was initiated because of unacceptable losses experienced in the capture of free-ranging turkeys using α-chloralose in a grain bait.

Six 4-wk-old domestic turkey hens weighing 760–850 g (mean weight, 783 g) were given 200 mg/kg ketamine hydrochloride (Parke, Davis & Company, Syracuse, New York 13201, USA) by mouth following a 3-hr period of food deprivation. The commercially available drug solution (100 mg/ml) was drawn into a 3-ml syringe and a red-rubber canine urinary catheter cut to 8-cm length was attached. The tube was passed approximately 6 cm into the esophagus and the drug deposited. Residual liquid in the tube was flushed into the esophagus with air. The procedure was well tolerated by the birds which were then released into a 6 × 2-m roofed enclosure. The birds were observed from a distance of 3 m for the following 2 hr, during which no obvious effect was apparent.

One wk later the same birds were redosed with 500 mg/kg ketamine using an identical technique. The first indication of anesthetic effect was a moderate ataxia which developed within 2 min in one bird, but from 6 to 10 min in the others. Within 15 min of dosing, spontaneous ambulation was absent in all birds; they rested in sternal recumbency with the head held under a wing. The eyes were closed. At this time an attempt was made to catch each bird but on approach, all six became aroused, stood up and successfully evaded capture. Ataxia was not evident. The birds were then left for 15 min without interruption,

but they remained aroused and no further signs of narcosis were obvious over the following 2 hr.

Anesthetic drugs which are normally effective when injected parenterally produce less predictable results when given by mouth. This is because the rate of drug absorption from the alimentary tract is extremely variable, being influenced by factors such as the presence of food, the degree of gut motility and the physicochemical properties of the drug (Baggot, 1977). Even when drug absorption occurs, it may then be metabolised in the gut wall, the portal venous blood or the liver prior to entry into the systemic circulation (Bennett, 1982). There is further unpredictability when the drug is included in grain presented as bait because the amount of drug ingested is uncontrolled, or the bait may be avoided altogether (Green, 1979). The long-term objective of this study was to develop a ketamine-treated bait that would result in safe and predictable chemical restraint within a short period of time following its consumption. Ketamine was chosen because of its high therapeutic index (4.8) in chickens (McGrath et al., 1984). In view of the poor results, it was felt that an effective bait would need to contain a drug concentration that would have compromised palatability. For this reason higher doses were not investigated.

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