

Notes and Records

Spotted hyaenas immobilized with Ketamine/Xylazine and antagonized with Tolazoline

The immobilization of large carnivores formed an integral part of extensive studies and management of the large carnivores in Etosha National Park, Namibia (Orford, Perrin & Berry, 1988; Gasaway, Mossestad & Stander, 1989). During 1986 nine spotted hyaenas (*Crocuta crocuta*, Erxleben) were immobilized to mark or fit collars equipped with radio transmitters (Gasaway *et al.*, 1989).

A ketamine hydrochloride (Ketalar, Park-Davis) and xylazine hydrochloride (Rompun, Bayer) combination (Van Jaarsveld, McKenzie & Meltzer, 1984; Van Wyk & Berry, 1986) was used for all immobilizations. Tolazoline hydrochloride (Priscoline, Weimer Pharmaceuticals, Rastat), an α_2 adrenergic antagonist (Martindale, 1982) known to reverse the effects of xylazine (Hartsfield, Thurmon & Benson, 1986) was used to reduce the duration of immobility (Van Wyk & Berry, 1986).

Materials and methods

Drug mixtures were delivered using darting techniques described in Stander & Morkel (1991). The use of a fresh and partly skinned springbok (*Antidorcas marsupialis*, Zimmerman) carcass dragged behind a vehicle or tied to a tree, in combination with sound recordings of spotted hyaena vocalizations, was essential to attract spotted hyaenas. All immobilized spotted hyaenas were weighed.

Ketamine powder was mixed with isotonic saline at a concentration of 210 mg ketamine/ml. Xylazine was obtained in a lyophilized powder form. Five mls of ketamine were added to a vial containing 500 mg of xylazine, yielding a concentration of 210 mg ketamine and 100 mg xylazine per ml. Based on estimated body mass before darting, adult spotted hyaenas received 3 ml and sub-adults 2 ml of the ketamine/xylazine solution.

Four mg/kg Tolazoline were administered intramuscularly to antagonize the effects of xylazine. First signs of recovery after immobilization with ketamine/xylazine were characterized by head lifting along with leg movement and reaction to painful stimuli. Based on the study by Van Wyk & Berry (1986), we assumed most of the ketamine had been metabolized when the hyaenas gained the above mentioned mobility and Tolazoline was then administered.

Results and discussion

Ketamine and xylazine formed an effective combination for immobilizing the nine spotted hyaenas (Table 1). The use of ketamine for spotted hyaena immobilizations mentioned by Smuts (1973) at a dosage rate of 7–15 mg kg⁻¹ resulted in a long recovery period of 1.5–3.5 hours. Van Jaarsveld *et al.* (1984) used a ketamine/xylazine combination of 10.7 mg kg⁻¹ and 0.5 mg kg⁻¹, respectively, and animals were tractable in an average of 10.5 min. Our dosages of 13.2 mg kg⁻¹ ketamine and

Table 1. Dosages, immobilization and recovery times for spotted hyaenas injected with a solution of 210 mg ketamine and 100 mg xylazine per ml, antagonized with Tolazoline

	Ketamine dosage (mg kg ⁻¹)	Xylazine dosage (mg kg ⁻¹)	Ataxia (min)	Tractable (min)	Tolazoline dosage (mg kg ⁻¹)	Recovery (min)
<i>n</i>	9	9	5	5	9	5
Mean	13.2	6.3	1.4	5.2	3.7	100
SD	2.5	1.2	0.5	2.6	0.6	35
Range	10–18.9	4.8–8.9	1–2	3–10	2.2–4.4	50–150

6.3 mg kg⁻¹ xylazine caused rapid induction and a smooth immobilization. With the administration of Tolazoline, recovery times averaged 100 minutes. Based on the work on lions (*Panthera leo*, Linnaeus) by Van Wyk & Berry (1986), the average dosage of 3.7 mg kg⁻¹ Tolazoline appeared to be as effective with spotted hyaenas in reducing the recovery time, although no control tests were performed.

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P. E. Stander* and **W. C. Gasaway** *Etosha Ecological Institute, Ministry of Wildlife, Conservation and Tourism, P.O. Okaukuejo, Namibia.*

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* Present and corresponding address: Department of Zoology, University of Cambridge, Downing Street, Cambridge CB2 3EJ, U.K.