Immobilization of three sub-species of reindeer (*Rangifer tarandus*) with medetomidine and medetomidine-ketamine and reversal of immobilization with atipamezole

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Summary: The sedative action of medetomidine (Farmos Group Ltd., Turku, Finland) and medetomidine with ketamine (Ketalar®, Park-Davis & Co., Pontypool, Gwent, U. K.) was studied in three subspecies of reindeer: Norwegian semi-domesticated reindeer (NR, *Rangifer tarandus tarandus*, n = 12, including 4 calves aged 5 to 14 days), Svalbard reindeer (SR, *R. t. platyrhynchus*, n = 7, Tyler et al. *in press*) and forest reindeer (FR, *R. t. fennicus*, n = 17, Jalanka *in prep.*). Medetomidine, with or without ketamine, caused effective, reliable dose-dependent im-

Table 1. Doses (μg/kg live weight) of medetomidine, medetomidine-ketamine and atipamezole in Norwegian reindeer aged > 2 yrs (NR), Svalbard reindeer (SR) and wild forest reindeer (FR) (number of trials).

	NR		SR		FR	
	median	range	median	range	median	range
Medetomidine (with Ketamine)	50	26 – 125 (11)		30 – 40 (2)	56	37 – 84 (37)
Ketamine (with Medetomidine)	540	300 – 1200 (11)		1000 – 1500 (2)	900	400 – 1900 (37)
Medetomidine (alone)	100	50 – 200 (10)	270	100 – 1125 (5)		
Atipamezole	300	80 – 790 (21)	250	100 – 1625 (7)	310	185 – 522 (34)
Atipamezole: medetomidine ratio (w/w)	4.9	3.1 – 7.8 (21)	1.4	1.0 – 5.5 (7)	5.0	4.0 – 7.0 (33)

Table 2. Response times (min.) of Norwegian reindeer aged > 2 yrs (NR), Svalbard reindeer (SR) and wild forest reindeer (FR) to medetomidine, medetomidine-ketamine and atipamezole (number of trials).

	NR		SR		FR	
	median	range	median	range	median	range
First sign of sedation	4	2 - 13 (16)			3	1 - 6 (33)
Onset of deep sedation*	8	4 - 25 (21)	21	4 - 91 (6)		
Dose time**	42	6 - 74 (18)	42	24 - 49 (7)	32	15 - 54 (34)
Arousal time***	8	4 - 27 (14)	8	6 - 15 (6)	2	1 - 8 (33)
Walking time***	12	5 - 27 (16)	7	6 - 15 (5)	2	1 - 14 (33)

* Time to lying in SR.

** Time from injection of anaesthetic to injection of antagonist.

*** Atipamezole was administered by intra-muscular injection (NR and SR) or by intravenous + intramuscular or intravenous + subcutaneous injection (FR).

mobilization in NR and FR. Doses of 50–200 μg/kg medetomidine alone or 30–125 μg/kg medetomidine combined with ≥ 300 μg/kg ketamine induced complete immobilization, good muscle relaxation and persistent, deep sedation with little respiratory depression in NR; SR required higher doses (Table 1). Recommended doses in FR are 60 μg/kg medetomidine with 600 μg/kg ketamine. Atipamezole (Farmos Group Ltd., Turku, Finland) successfully antagonized medetomidine (-ketamine) resulting in rapid and persistant reversal of immobilization (NR, SR and FR, Table 2). In some cases FR at first recovered fully from immobilization but relapsed into partial sedation for 2 to 4 h after administration of atipamezole. There were no conspicuous lasting side effects to either immobilization or reversal in any of the three subspecies.

References:

Jalanka, H.: Medetomidine- and ketamine-indued immobilization in forest reindeer (*Rangifer tarandus fennicus*) and its reversal by atipamezole. - *Proceedings of the American Association of Zoo Veterinarians, Greensboro, North Carolina. (in press).*

Tyler, N. J. C., Hotvedt, R., Blix, A. S. and **Sørensen, D. R.:** Immobilization of Norwegian reindeer (*Rangifer tarandus tarandus*) and Svalbard reindeer *R. t. platyrhynchus*) with medetomidine and medetomidine-ketamine and reversal of immobilization with atipamezole. - *Acta veterinaria Scandinavica (in press).*