
IMMOBILIZATION OF CALIFORNIA SEA LIONS (*Zalophus californianus*) USING MEDETOMIDINE AND KETAMINE AND REVERSAL WITH ATIPAMEZOLE

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Abstract

Safe and efficacious immobilization of marine mammals continues to be an area of intensive investigation. Particularly challenging are large, free-ranging otariids that are not easily manually restrained and which do not have readily accessible blood vessels that allow intravenous administration of short-acting agents that can be safely titrated to effect. For these animals, administration of anesthetic agents continues to be best accomplished by the intramuscular (i.m.) route. Many currently used i.m. agents are associated with prolonged recovery times that can create problems in field conditions. The recent introduction of the α 2-agonist medetomidine to North America may provide a distinct advantage over previously used agents because of its reversibility by the α 2-antagonist atipamezole.

From May 1997-February 1998, 16 male and 20 female California sea lions (*Zalophus californianus*), varying in weight from 18-145 kg, were immobilized for a variety of medical procedures at a rehabilitation center in Northern California using a combination of medetomidine and ketamine. Atropine (0.02 mg/kg) was given i.m. to each animal at least 10 min prior to administration of the medetomidine/ketamine combination. Each animal was given 140 μ g/kg medetomidine and 2.5 mg/kg of ketamine i.m. by either hand injection ($n = 32$) or blowdart ($n = 4$). Both drugs were administered together in the same syringe. Sites of injection included muscle immediately surrounding the pelvis, femur and tibia and muscle overlying the scapula.

Time to immobilization (mean \pm SD) for hand injection was 8.8 ± 5.4 min and was significantly ($P < 0.01$) lower than for those animals immobilized by blowdart (16.8 ± 5.9 min). An adequate plane of anesthesia was not achieved in seven animals, two of which had been blowdarted, and additional ketamine (1/2 of the original dose) was given to four animals. The remaining three animals were physically restrained to complete the desired procedures. Nine animals were intubated during the procedure. Five of these were intubated after being given medetomidine/ketamine only while the remaining four were masked down with isoflurane to allow intubation.

Total immobilization times varied from 17-57 min with a mean of 31.3 ± 10.1 min for animals that were given only the initial dose of medetomidine/ketamine and were not placed on gas anesthesia. Recovery times for these animals were 9.9 ± 6.1 min after being given 200 μ g/kg atipamezole i.m. No animals died during the study.

Disadvantages of medetomidine/ketamine use in sea lions include a moderate variation in induction time and plane of anesthesia. Since there was a significant difference in these parameters between animals anesthetized by hand injection and by blowdart administration, where penetration into muscle may not have been reliably achieved, it is thought that some of the variation may be due to injection into poorly vascularized sites such as blubber. In addition, the commercially available 1.0 mg/ml solution of medetomidine requires that very large volumes be used at the recommended dose for sea lions. Lyophilization followed by reconstitution to a concentration of 10 mg/ml produces a much more manageable injection volume.

The advantages of medetomidine/ketamine include safe and reversible immobilization that can be easily administered by the i.m. route and that produces a plane of anesthesia that is sufficient to carry out most routine diagnostic procedures.