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ABSTRACT: We opportunistically evaluated a combination of acepromazine maleate and medetomidine HCl for use in sedating Rocky Mountain elk (*Cervus elaphus nelsoni*) and black bears (*Ursus americanus*) as an alternative to scheduled drug combinations. This combination was safe and effective with limitations inherent in its sedative rather than anesthetic properties.

Wildlife professionals capture and handle large mammals for a variety of reasons. Potent drug combinations have been developed for wildlife immobilization (Kreeger and Arnemo 2012); however, regulations can limit or preclude field use of some drugs. Such restrictions on nonveterinary field personnel motivated us to identify alternative drug combinations that could be prescribed to our agency's staff. In addition to being safe and effective, a key criterion was that components not be listed as scheduled drugs under the US Controlled Substances Act (reviewed by Kreeger and Arnemo 2012). To this end, we evaluated a combination of acepromazine maleate and medetomidine HCl (AcMe) for wildlife capture opportunistically in the course of routine field work conducted throughout Colorado, USA.

Rocky Mountain elk (*Cervus elaphus nelsoni*) and black bears (*Ursus americanus*) are commonly handled by wildlife managers in Colorado. Both acepromazine and medetomidine have been used in a variety of wildlife species, including elk and black bears or related species (Jalanka and Roeken 1990; Wolfe et al. 2008; Evans et al. 2012; Kamine et al. 2012; Kreeger and Arnemo 2012; Wolfe et al. 2014). Based on previous success with butorphanol-azaperone-medetomidine (BAM) in both species (Wolfe et al. 2008, 2014) and observations that medetomidine alone or combined with azaperone only were insufficient for handling (L.L.W. unpubl. data), we chose acepromazine as an alternative but somewhat more potent tranquilizer to synergize medetomidine effects.

We initially used AcMe in adult female elk captured for disease testing or marking beginning in 2012. Elk received a combination of 15 mg acepromazine (10 mg/mL; Vedco, Inc., Saint Joseph, Missouri, USA) and 20 mg medetomidine (40 mg/mL; Wildlife Pharmaceuticals, Windsor, Colorado, USA; $n=32$) or 16 mg acepromazine and 16 mg medetomidine ($n=20$) delivered intramuscularly (IM) via 2-mL darts. Induction (time from injection to sternal recumbency) was not precisely recorded but fell within 7–15 min. All 52 elk immobilized with AcMe were adequately sedated for handling (ear tagging, radio collaring, rectal biopsy, and blood draw). Because of the potential for hypoxemia (Wolfe et al. 2014), elk received prophylactic oxygen by nasal insufflation (flow rate of 2–3 L/min) using a nasal catheter. We antagonized medetomidine with 600 mg tolazoline HCl (Lloyd Laboratories, Shenandoah, Iowa, USA) IM about 5 min before administering 25 mg atipamezole (Zoetis, Florham Park, New Jersey, USA; full dose IM or divided 25% intravenously [IV] and the remainder IM) as recommended for BAM (Wolfe et al. 2014); elk

stood within <5–15 min, depending on whether atipamezole was administered IV. Qualitatively, AcMe produced effects similar to BAM in elk (Wolfe et al. 2014), except that tranquilization after recovery was somewhat more pronounced with AcMe. Atipamezole alone (5 mg/mg medetomidine) can be used to antagonize medetomidine, but in our experience, a lower dose of atipamezole can be used when combined with tolazoline to lower cost. AcMe offers an alternative to scheduled drug combinations for elk capture; the recommended dose is 16 mg acepromazine (1.6 mL) and 16 mg medetomidine (0.4 mL) for adult elk.

We also used AcMe to sedate black bears. Subadult bears ($n=25$) held for rehabilitation were sedated with AcMe to facilitate prerelease exams and ear tagging. We premixed 3 mL of acepromazine (10 mg/mL) and 1 mL medetomidine (40 mg/mL) solution to yield AcMe solution, with final concentrations of 7.5 and 10 mg/mL, respectively. We estimated weights for dosing, then delivered AcMe using a pole syringe (Dan-Inject). Post hoc, actual weights averaged 34.3±17.0 (SD) kg, and dosage averaged ~0.07±0.05 mg acepromazine/kg and 0.11±0.08 mg medetomidine/kg but varied widely (e.g., 0.09–0.22 mg/kg medetomidine). Two bears dosed at 0.09 or 0.1 mg/kg were inadequately sedated. Induction averaged 11.3±4.1 min for 13 of the 23 sedated bears that remained within view throughout induction; 10 bears that hid from view during induction were already sedated when checked 15 min after AcMe injection. We antagonized medetomidine with 100 mg tolazoline IM and 15 mg atipamezole IM. Recovery (time from injection to standing) averaged 8.1±3.6 min ($n=12$).

Based on the results in captive bears, we next used premixed AcMe solution on 56 free-ranging bears. These bears were captured in cage traps in conjunction with an ongoing study (Johnson et al. 2011). We estimated weights, dosed at 0.5 mL AcMe/45 kg (0.08 mg/kg acepromazine and 0.11 mg/kg medetomidine) and delivered drug via pole syringe. Sedated bears received oxygen, as described previously, and were weighed, bled, and fitted with a radio collar. Twenty (36%) required additional AcMe; in three cases, there was brief arousal or jaw snapping similar to events reported in immobilized bears (Kreeger and Arnemo 2012). Weights averaged 74.4±36.2 kg. Post hoc dosage (including added drug) averaged 0.1±0.02 mg acepromazine/kg and 0.14±0.03 mg medetomidine/kg. Induction averaged 14.7±4.7 min for 35 bears given a single AcMe injection and 26.2±10.4 min for bears requiring supplement. All of the bears but one were adequately sedated. We antagonized medetomidine with either 5 mg atipamazole/mg medetomidine or 0.4 mg/kg tolazoline IM and 2 mg atipamezole/mg medetomidine IM. Recovery averaged 15.5±8.3 min for 48 bears directly observed; the two antagonist regimens yielded qualitatively similar recoveries.

Seventeen additional bears captured by field officers because of human conflicts provided further opportunity for evaluating AcMe. Bears were dosed at 0.5 mL AcMe/45 kg (0.08 mg/kg acepromazine and 0.11 mg/kg medetomidine) delivered via pole or projectile syringe. Post hoc dosage averaged 0.17±0.1 mg acepromazine/kg and 0.23±0.2 mg medetomidine/kg. Although all 17 bears were captured, in five cases, sedation was reportedly inadequate for handling, and officers used additional drugs or alternate handling methods.

AcMe offers potential as an alternative drug combination for sedating black bears and elk in situations in which use of scheduled drug combinations is precluded. Although apparently safe, this combination has limitations inherent in its sedative rather than anesthetic properties. Inconsistency reported by field officers may be due, in part, to circumstances surrounding capture: animals in conflict situations were likely anxious, and sensory

stimulation (e.g., barking dogs, traffic, and people talking) also may have hampered sedation; less consistent or predictable drug delivery also may have contributed. Consequently, we recommend minimizing sensory stimulus and muzzling and hobbling bears drugged with AcMe.

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