

Chemical restraint of large crocodilians: Aims and objectives for safe and reliable management

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Abstract: The key objectives of chemical restraint of large crocodilians are to provide safe restraint for both crocodile and handlers, and to ensure best welfare practices are always carried out. Neuromuscular blocking agents have been used historically but are difficult to procure and present certain welfare concerns. Several other sedatives and muscle relaxants have proven very useful across a diverse range of activities and are discussed in the context of common capture and restraint scenarios. As well as considering the practical implications and limitations of each drug or combination of drugs, the physiological impact of each agent on the animal is reviewed. Effect of environmental temperature, recent animal activity level, route of administration, availability and reversibility of the drugs are discussed. Benzodiazepines (diazepam, midazolam) provide anxiolysis, muscle relaxation and alteration of consciousness. Midazolam has potent amnesiac properties which is particularly useful when relocating large animals or undertaking stressful procedures. Flumazenil antagonises benzodiazepines, although this is rarely required. Voluntary respiration and airway protection are particularly useful features of midazolam restraint. Alpha-2 agonists (xylazine, medetomidine) provide analgesia, potent muscle relaxation and an altered state of consciousness. The airway is poorly protected as the gular fold relaxes under alpha-2 agonists. These drugs are effectively antagonised by yohimbine and atipamezole respectively. Restraint is safe, repeatable, and highly effective. Intubation is possible under medetomidine alone, for ventilation or gaseous anaesthesia. Neuromuscular blocking agents (pancuronium, vecuronium, rocuronium) effectively paralyse the patient, but have no anxiolytic or analgesic properties, do not provide muscular relaxation, and have no effect on the conscious state. If used for restraint, these drugs must be given in combination with sedation that produces an altered state of consciousness and relaxation of skeletal muscle groups. Analgesia must also be provided for invasive procedures.

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