

ANAESTHETIC MANAGEMENT IN WILD AND CAPTIVE ANIMALS AND BIRDS

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For all surgical manipulations, anaesthesia is an essential pre-requisite. Manual restraint of untamed animals and birds may not be possible in many instances. Oral administration of drugs in the form of baits may not be successful because of the colour, smell, taste etc of the drug. Parenteral administration is the popular method. In most of the species inhalation anaesthesia gives excellent results. But administration of inhalant agent is difficult without injectable induction of anaesthesia. Intramuscular agents are administered either by hand syringe, pole syringe or projectile syringe attached to blowpipes, crossbows, pistols or rifles.

In tamed captive animals and birds the drug can be administered by direct injection with hand syringe. In zoos squeeze cages are available. A metal or plastic syringe may be preferred to glass syringe. Instead of hand syringe, pole syringe can also be used for giving injection for animals that are in approachable distance. For wild animals that are within limited ranges blowpipes and crossbows and not within limited ranges Cap-chur guns are preferred.

I. Anaesthesia for Wild and Captive Animals

PRIMATES: Ketamine is the most commonly used agent. The recommended dose is 10-40 mg/kg bodyweight. The lower doses will provide good restraint for minor surgical procedures and higher doses will produce surgical anaesthesia. The induction and recovery will be smooth and uneventful. Induction with ketamine followed by maintenance with inhalant anaesthetics produces complete anaesthesia. A combination of xylazine (2.0 mg/kg) and ketamine (6.25 mg/kg) was found excellent in anaesthetizing bonnet macaque. Trials with tiletamine-zolazepam (5-15 mg/kg i.m.) are also giving promising results.

RABBITS: A combination xylazine (5mg/kg) and ketamine (50mg/kg) i.m. produces satisfactory

surgical anaesthesia in rabbits. Tiletamine-zolazepam combination at the dose rate of 13-40 mg/kg can be used to anaesthetize rabbits.

RODENTS: (eg. Guinea pig, rat, mice, hamsters)

For anaesthetizing guinea pig the recommended of ketamine is 22-44 mg/kg i.m. and tiletamine zolazepam is 40-60mg/kg.i.m.

INSECTIVORES: (eg. hedgehogs, tenrecs, shrews, moles)

Hedgehogs can be anaesthetized by i/p. administration of pentobarbital sodium at the dose rate of 20 mg/500g body weight. Ketamine at the dose rate of 1-2 mg/100g.i.m. alongwith 0.2mg of xylazine/100g. of bodyweight also forms an anaesthetic regime. Inhalation anaesthesia can be administered in bell jar or chamber.

CARNIVORES: (eg. Lion, bear, tiger, panda, hyena, jackal, wolf, otter)

Felines can be immobilized with i.m. administration of ketamine (10-22mg/kg) and xylazine (2mg/kg). For achieving general anaesthesia either additional dosages of the drugs or inhalation anaesthesia can be employed. Tiletamine-zolazepam (2.2mg/kg bodyweight i.m) is recommended for immobilizing lion, leopard and cheetah.

Ketamine administered at the rate of 4-10mg/kg.i.m. in conjunction with 2 mg/kg xylazine i.m. or tiletamine zolazepam at the rate of 4.9mg/kg.i.m. may be used to immobilize bears. Striped hyena can be anaesthetized with i.m. administration of Innovar-vet (droperidol-fentanyl) at the dose of 0.11ml/kg. Administration of tiletamine-zolazepam at the rate of 4.0mg/kg.i.m. can effects anaesthesia in civer cat.

ELEPHANTS, ZEBRAS, TAPIRS, HIPPO AND RHINOCERS: Etorphine (M99) i.m is the drug of choice for these mammals. This drug has a specific

antagonist, diprenorphine (M 50-50), which is given i.v. at two times the etorphine dose to reverse the effects of etorphine when the procedure is completed. In combination with xylazine, etorphine provides smooth immobilization. Xylazine alone may be used in elephants at the rate of 0.08-0.15mg/kg.i.m.

RUMINANTS: (eg. Camel, deer, elk, llama, giraffe)

In most of the animals etorphine is the drug of choice. Xylazine can be used in combination with etorphine at the rate of 0.2-0.5mg/kg i.m. The average total dose of etorphine per animal recommended is as follows :

For ruminants weighing less than 50Kg – 0.5 to 2.0 mg.

Between 50 to 125 Kg 1.3 to 3.0 mg.

More than 125 Kg – 3.0 to 5.0 mg

But the effective dose is species dependent rather than weight dependent.

Signs of drug action/Anaesthesia

Increased salivation, Standing but reluctant to move, Incoordination of movements/running, Standing away from the group, Dropping of eyelids, Keeping the head lowered, Relaxation and protrusion of penis, Kneeling or straddled leg stand, Recumbency

Disappearance of visual/auditory/pain reflexes etc.

Do's and Don'ts

Prevent bloat in ruminants: Position the animal on sternal recumbency with the head held up. If necessary rumen puncture may be resorted to. Protect the animal from cold and heat. Protect the eyes the animal direct sunlight In Ketamine anaesthesia the eyes will be open, hence apply bland ophthalmic ointments to prevent the chance of developing exposure keratitis. Keep the animal on sternal recumbency to prevent hypostatic congestion and radial paralysis.

Avoid regurgitation: The head should not be directed downhill. Use antidotes whenever possible. Direct contact of the personnel with drug should be avoided. It was reported that the lethal human dose of etorphine is just 0.03-0.12mg, a mere drop. It is recommended that etorphine be used only by designated, trained and responsible personnel familiar with emergency treatment of an accidental administration into a human.

II. ANAESTHESIA FOR BIRDS: Due to lack of familiarity with various avian species, many veterinarians are reluctant to anaesthetize birds. But with increasing popularity of pet birds and rising interest in wild bird medicine, more veterinarians will need this skill.

LOCAL ANAESTHESIA Local anaesthesia is seldom used in birds because of the following reasons :

Cutaneous sensation in birds is limited compared with mammals and thus for minor surgical manipulations like suturing of skin wounds seems to cause them little pain. The small size of many avian patients makes overdosage of local anaesthetic agents a real danger. Local anaesthesia may deaden any pain the patient is perceiving, but does little to protect from stress. Small birds like budgerigar may even die during handling. Like that, wild birds which had little contact with humans prone to stress due to the effect of manipulations. Handling of these birds in hand is dangerous without making them unconscious.

GENERAL ANAESTHESIA

i) **Injectable anaesthetics :** It requires little equipment and convenient for many of the short procedures such as radiography, wound repair and laparoscopy. Calculation of body weight for determining the appropriate dosage, may be difficult when the bird is small with a large tumour. It is also difficult to control the depth and duration of anaesthesia when we use an injectable anaesthetic.

Some of the drugs used are :

BARBITURATES: Pentobarbital is widely used and can be given i.m., i.v. and oral route. The duration of anaesthesia produced by any these routes is about 30 minutes. In most species, but recovery is generally prolonged and may take up to 12 hours. A combination of pentobarbital, chloral hydrate and magnesium sulphate has been also recommended in birds. The i.v. dose is 1.0-1.5ml/kg and i.m. dose is 2.5ml/kg (2.0 ml/kg in obese or debilitated birds). Intramuscular administration may bring about muscle necrosis.

METOMIDATE: It is a poor analgesic and will not produce deeper plane of anaesthesia. The recommended i.m. dose is 3.20 mg/kg. The lower doses produce immobilization and higher doses light anaesthesia for minor procedures. Its major disadvantage is the long period of recovery, ranging from less than 6 to more than 40 hours, depending on the species of bird and dose of

drug received. It produces copious salivation that is non-responsive to atropine. In some birds it could be dangerous because of the obstruction of airways.

SAFFAN: (CT 1341) It is a steroid anaesthetic given by I.V. route at a dose of about 10mg/kg. The anaesthesia produced is alight and lasts for 5-15 minutes. The dosage can be repeated if necessary. Since large volume is required i.m. route is not preferred. The chief advantage is that the recovery is rapid, i.e. less than 30 minutes and most of the birds are standing and feeding within 15 minutes.

KETAMINE: The drug on i.m. administration produces anaesthesia within 3-5 minutes and lasts for 10-30 minutes duration. The recovery period ranges from 30 minutes to 5 hours. It can be given i.v. to larger birds. If combined with i.v. diazepam it produces smooth induction and recovery and enhanced muscle relaxation. The usual dosage of ketamine is 30-40mg/kg and of diazepam is 1.0-1.5mg/kg. The excessive salivation produced is not as does with metomidate. With ketamine alone the muscle relaxation produced is poor. Tremors and wing flapping are quite common. The recovery can also be violent. Intravenous administration of diazepam alleviate this problem somewhat. Pre-medication with xylazine (upto 5mg/kg im) prior to ketamine @ 10-20 mg i.m) increases the muscle relaxation and analgesia produced by ketamine. At the dose rate of 30mg/kg.i.m ketamine was found satisfactory for the amputation of the wing of a pelican.

ii) Inhalation anaesthesia

It is the method choice for lengthy procedures because it can be maintained as long as necessary and the depth of anaesthesia can be controlled. Recovery from some of the anaesthetic agents is quite rapid. Induction is achieved by administration of ketamine and the anaesthesia thus produced is enough to perform intubation. Endotracheal intubation is easy in birds, because the glottis is large and visible at the base of the tongue. The tube is secured by taping it to the lower beak; otherwise it may be dislodged during surgery. In order to reduce salivary secretion atropine at a dose of 0.04-0.9mg/kg is recommended. Some of the agents used for producing inhalation anaesthesia in birds are :

ETHER: It is most frequently administered by open-drop facemask technique. Induction and

recovery are rapid. Being very explosive electrocautery procedures cannot be adopted. It is very difficult to control the depth of anaesthesia with ether, especially when open-drop method is used.

NITROUS OXIDE: Nitrous oxide alone is incapable of producing anaesthesia in birds. It can be used in combination with halothane and methoxyflurane. The concentration of halothane or methoxyflurane can be reduced to one-quarter to one third when nitrous oxide is added to the mixture.

METHOXYFLURANE: Methoxyflurane can be administered either by open drop technique or through a standard anaesthetic apparatus with vapouriser. It produces more stable plane of anaesthesia than halothane, but the induction and recovery is longer. An initial 3% concentration is used for induction of anaesthesia and maintenance 0.5-1.5% vaporizer concentration. Induction takes place in 4-5 minutes and recovery is prolonged. Larger birds take 45 minutes to 1 hour to stand up after surgery.

HALOTHANE: Halothane must be administered through an anaesthetic system using a calibrated vaporiser. Induction takes place in 2-4 minutes. For induction, an anaesthetic vaporizer concentration of 2% is required for small birds and 2.5 to 3% for larger ones. The maintenance concentration varies from 0.5-1.5%. Recovery usually takes from 3-5 minutes.

ISOFLURANE: Induction with isoflurane is rapid, usually 1-2 minutes at a concentration of 3% and renders a bird ready for recovery. For maintenance a concentration of 1.5% is found effective. Recovery is immediate and most birds are standing within 5 minutes. Hypothermia is the main post-anaesthetic complication in birds. Hence all the birds subjected to anaesthesia should be kept in heating pads throughout surgery and recovery period. Small birds can be kept warm by placing them on surgical gloves filled with warm water. Alcohol scrubs prior to surgery should be avoided. Hypoglycemia is a problem in birds because of fasting. Fasting even for a few hours may produce hypoglycemia. If a bird is found hypoglycaemic 5% dextrose is to be administered i.v or s.c. route. It will help to maintain the body temperature also.

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