Module # 3 – Component # 2

Drugs Accidents & Responses

Introduction

Drugs used for the capture of wildlife are also potentially dangerous to humans, especially the narcotics to which they are particularly sensitive. Knowledge of the safety aspects of the use of these drugs is paramount and indeed a prerequisite for the issue of a drug licence. The safety details that follow have been reproduced and modified from Pete Morkel’s chapter in the Capture and care manual (McKenzie, 1993) and reproduced in Chapter 6 of the course manual, Chemical and physical restraint of wild animals (Kock & Meltzer, in print).

The chemical immobilisation of wild animals requires the use of powerful drugs. Serious toxicity, and even death, can result from accidental human contact with these drugs. Moreover, wild animals are often caught in remote areas where medical help may not be available and unqualified people may have to be called on to perform life-saving medical procedures when there is accidental contact with dangerous drugs.

Remember, there is a real danger to the victim’s life if the wrong drug, or the wrong dose of the drug, is given. The aim must be to maintain life until professional medical care is available.

The legal implications of the administration of medical treatment to an accident victim by persons who are not qualified medical practitioners vary from country to country. The reader is advised to establish the legalities of administering first aid in the country in which he or she works.
Using Capture Drugs

Precautions

In most instances, capture drug accidents can be avoided by adhering to certain precautions, as set out below.

Knowledge

- Be thoroughly trained in the use of capture drugs.
- Attend regular refresher courses.
- Know basic first-aid techniques, including cardiopulmonary resuscitation (CPR).
- Educate your local medical professionals about the drugs you use for capture. Most of these drugs will be foreign to them. Give them all the information you have on the drugs, antidotes, etc. Discuss your safety and emergency procedures with them.
- Discuss safety and emergency procedures with your staff.

Control

- Before a capture operation, check your communications and transport infrastructure so that you can respond quickly in an emergency.
- Use capture drugs only in the presence of a second person who is trained in their use and in the management of accidents.
- When working with dangerous drugs, always limit the personnel present to those essential to the operation.

Concentration

- Respect the potency of these drugs \( \Rightarrow \text{never take chances and never underestimate a potentially dangerous situation.} \)
- Always concentrate on what you are doing, and work in an orderly fashion.

Restricted physical contact

- Never eat, drink, smoke or rub your eyes when working with capture drugs.
- If you have cuts or abrasions on your hands, put a plaster on the affected area or wear gloves. Where practical, always wear glasses and gloves to protect the eyes and skin when working with powerful capture drugs.
- Be careful never to inhale drugs that are in powder or aerosol form.
- Never work with opioid drugs in a moving vehicle, and exercise care in a helicopter.
Emergency kit

- Never work with opioid drugs without having the human antidote at hand in the emergency kit.
- Always keep basic notes on capture drugs and emergency treatment, as well as emergency telephone numbers, in your drug box, first-aid kit and/or emergency kit.
- The emergency kit should consist of a bottle of Naltrexone (50 mg per ml), at least two clean 2 ml plastic syringes with two 21-gauge (0,8 mm, 38 mm [green]) hypodermic needles, a rubber tourniquet, a clamp and a card with antidote dosages. This kit should be kept in a place of prominence in the drug box and brought to the attention of an assistant when dealing with opioids.

Syringe use

- Use a needle to equalise the air pressure inside and outside all new vials before attempting to draw up the drug.
- Do not push air into the vials of powerful drugs – the fluid may leak out.
- Use a small syringe (1 or 2 ml) with a thin needle (21-gauge/0,8 mm or thinner) for drawing up concentrated solutions of powerful drugs.
- Take extreme care with loaded darts. Carry them in a container such as a cigar case, drug box, etc. Darts that work with compressed air or gas, or with a spring, should only be armed immediately before use.
- Consider all dart guns loaded, and all darts filled, until you know otherwise → Treat them accordingly.

Storage

- Lock all capture drugs away when they are not being used.
- Immediately label all drugs, containers, unused darts and filled syringes that are not in use.
- Keep all used syringes, darts, needles and vials in a safe place until they can be disposed of properly. Dispose of them yourself – other people may take shortcuts!

Carcasses

Never allow a carcass from an animal that has died during, or even sometime after, chemical immobilisation, to be consumed. Supervise the destruction of the carcass yourself.
Accidental Contamination

Capture drugs are often used in combination to achieve better immobilisation of the animals. This can result in a more pronounced effect than if only a single drug is involved. It may also complicate the interpretation of symptoms and treatment.

If Hyaluronidase is used in the drug mixture, absorption will tend to be quicker. Accidental self-injection with some darts can result in sufficient muscle damage to give what effectively amounts to an intravenous injection.

Two groups of drugs warrant special mention. **Opioids** are used extensively for the routine immobilisation of herbivores and occasionally for carnivores. **Neuromuscular blockers** were the first drugs used to immobilise wild animals. They have largely been replaced by newer, safer drugs, but are still used for the chemical restraint of crocodiles and for culling purposes. **Accidental injection** of humans with drugs belonging to either of these two groups is a **life-threatening** event. Prompt action is vital if the victim is to be saved.

Opioids are narcotics, and include Etorphine hydrochloride (M99), Carfentanil, Fentanyl and A3080. Do not work with opioids unless you are accompanied by a second person who is qualified to work with capture drugs and who is informed on how to deal with a possible accident. You must also have an emergency kit in your drug box.

In southern Africa, Naloxone is available only in 0,4 mg ampoules. This is unsatisfactory for the reversal of large amounts of potent opioids. If you wish to carry Naloxone, try to obtain it in a greater concentration and volume. Alternatively, always ensure that you have at least twenty ampoules of 0,4 mg Naloxone in your emergency kit. With the availability of Naltrexone, it is not necessary to carry Naloxone as well.

Etorphine is not absorbed through intact skin, unless dissolved in DMSO, which is not usually the case. Nevertheless, always wash off any Etorphine as soon as possible after it comes into contact with the skin. If sufficient water is not available, a wet cloth can be used. Etorphine, however, is absorbed through broken skin like cuts and abrasions, as well as via the membranes of the eyes, nose and mouth. If you have cuts or abrasions on your hands, apply a plaster to the affected area or put on gloves beforehand. Never put anything into your mouth (food, cigarettes, syringes, needle covers, etc.) or rub your hands while working with Etorphine.
Symptoms of Etorphine Poisoning in Humans

- Dizziness and in-coordination
- Nausea and vomiting
- Pinpointed pupils
- Slow, shallow or absent breathing
- Bluish tinge to the skin and mucous membranes
- Drop in blood pressure and shock – cold, clammy skin, difficulty in raising veins, weak pulse
- Loss of consciousness
- Heart failure
- Dilated pupils, followed by death, if no treatment is instituted

As little as 0,1 mg of Etorphine may be fatal to an adult man. When combined with a sedative, the depressant effect of Etorphine is considerably enhanced.
Response to Contact with Etorphine and Other Opioids

1) Immediately make a second person aware of the problem.

2) If Etorphine has come into contact with intact skin, wash immediately with copious quantities of water. If it has come into contact with the membranes of the eyes, mouth or nose, assume that absorption has taken place. Treat with antidote (see point 3 below) and then wash immediately with copious amounts of water.

3) If you know, or suspect, that one of the opioids has been absorbed: using Naltrexone, immediately inject 25–50 mg intramuscularly, then 25–50 mg intravenously (50 mg of Naltrexone to 1 mg of Etorphine).

4) If there is no Naltrexone immediately available, administer 0,8 mg of Naloxone (two ampoules of Narcan) into the most available muscle, and 0,8 mg of Naloxone into a vein of the forearm. If you cannot find a vein, give the Naloxone into the muscle as well and massage the area. If the patient is comatose and a vein is not readily available, then the antidote is best injected deep into the tongue, as this ensures very rapid absorption.

5) If there is no improvement, or there is further deterioration in the victim’s condition, give additional Naltrexone or Naloxone as described above until improvement occurs. Breathing will be the first aspect to improve – the rate and depth of breathing will increase. As Naltrexone and Naloxone are very safe, overdosing is almost impossible.

6) Keep the patient calm and in the shade. Put the person in a horizontal position lying on his or her side. Send for, or take the patient to expert medical help. The most responsible or knowledgeable person must remain with the patient at all times. Naloxone is metabolised more rapidly than Etorphine, Carfentanil and Fentanyl, so that re-narcotisation often occurs – be prepared!

7) Naltrexone, however, has a long half-life, therefore re-narcotisation is unlikely to occur. Maintain adequate breathing and administer CPR. Clean saliva and vomitus from the mouth.

8) Keep the tongue pulled out. Keep the head up and back, and the mouth open.

9) Give additional Naltrexone or Naloxone if breathing remains slow or shallow.

10) If there has been no response to the antidote, and the condition appears life-threatening, give Doxapram (Dopram) at 3 ml per 70 kg into a vein. This dose can be repeated every ten minutes. Note: Too much Doxapram will cause convulsions.