Anesthetic protocols for Red Deer (*Cervus elaphus*), Fallow Deer (*Dama dama*) and Barbary Sheep (*Ammotragus lervia*) in Semi-captivity

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INTRODUCTION

In the fields of wildlife research, conservation and management, physical contact with the animal is sometimes essential to successfully carry out certain procedures. People have developed different forms of physical restraint and have proven that many of these methods cause a high level of stress to the animal. Chemical immobilization is the safest method for the personnel involved in the procedure which minimizes the stress and risks associated with it.

OBJECTIVES

1. Understand the reasons for performing anesthesia in ungulates.
2. Explain the basis of anesthesia in ungulates.
3. Make a bibliographic review on the most used anesthetic protocols in Red Deer, Fallow Deer and Barbary Sheep.
4. Compare the anesthetic protocols in each species and determine the most recommendable ones.

UNGULATES ANESTHESIA

Pre-anesthetic Considerations

There are many factors that can influence the method of anesthesia and the ways of administering the drugs.

Capture events must be carefully planned to avoid prolonged chase times in an effort to prevent capture myopathy, trauma or hyperthermia.

Chemical Restraint

Most nondomestic species are uncooperative or too dangerous to use traditional routes of drug administration therefore it is appropriate to use chemical restraint.

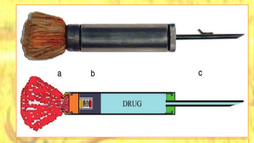

Image 1. Photograph and illustration of a gunpowder explosive-powered dart. (West et al. 2014).

When injectable anesthetic agents are used in unrestrained nondomestic species, a remote delivery system consisting of a dart and projector is often the most practical option. Darts can be projected via a blowpipe, compressed air projector, or gunpowder cartridge rifle.

Monitoring

Pulse oximetry or arterial blood gas analysis should be used to monitor oxygenation.

Rectal temperature should be monitored every 5–10 minutes. Deer and sheep are prone to hyperthermia.

Heart rate should be monitored, at minimum, every 5 minutes.

Image 2. Heart rate monitoring in a Barbary Sheep.

Anesthetic Drugs Classification

Anesthetic Drugs	Exemples	Antagonists
Neruomuscular blockers	Succinylcholine	Neostigmine
Sedative Drugs	α-2 Adrenergic Agonists: Xylazine, Medetomidine, Detomidine	Atipemazole, Yohimbine
Dissociative Anesthetics	Ketamine, Tiletamine/Zolazepam	-
Opiods	Ethorfin, Carfentanil, Fentanil, Butorphanol	Nalaxone, Naltrexone

ANESTHETIC PROTOCOLS

Red Deer

Chordata, Mammalia, Artiodactyla, Cervidae, Cervus

Butorphanol	0,11 mg/kg
Azaperone	0,07 mg/kg
Medetomidine	0,05 mg/kg

Miller and Fowler 2012

Carfentanil	10 µg/kg
Xylazine	0,1 mg/kg

Kreeger 1996

Xylazine	0,4 mg/kg
Tiletamine/Zolazepam	3 mg/kg

Kreeger 1996

Ketamine	2 mg/kg
Xylazine	0,8 mg/kg

Santiago y Lopez 2010

CONCLUSION
Recommended protocol

Ketamine	2,2 mg/kg
Medetomidine	0,11 mg/kg

Kreeger 1996

Fallow Deer

Chordata, Mammalia, Artiodactyla, Cervidae, Dama

Xylazine	0,6 – 0,9 mg/kg
Tiletamine/Zolazepam	4 - 5 mg/kg

Galka et al. 1999

Medetomidine	0,1 mg/kg
Tiletamine/Zolazepam	1 mg/kg

Fernandez-Moran et al. 2000

Detomidine	0,1 – 0,2 mg/kg
Tiletamine/Zolazepam	3 – 6,3 mg/kg

Galka et al. 1999

Ketamine	4 mg/kg
Xylazine	3 mg/kg

Kreeger 1996

CONCLUSION
Recommended protocol

Ketamine	2,5 mg/kg
Medetomidine	0,1 mg/kg

Kreeger 1996

Barbary Sheep

Chordata, Mammalia, Artiodactyla, Bovidae, Caprinae, Ammotragus

Tiletamine/Zolazepam	6 – 8,6 mg/kg

Santiago y Lopez 2010; Kreeger 1996

Ketamine	1,5 mg/kg
Medetomidine	1,2 mg/kg

Kreeger 1996

CONCLUSION
Recommended protocol

Ketamine	10 mg/kg
Xylazine	2,5 mg/kg

Kreeger 1996

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