This medicine is not authorized for veterinary use. The use is permitted on the grounds of regulation EU 2019/6, article 112 and 113. This product information has been composed with the utmost care by the Veterinary pharmacy of Utrecht University and is intended as a source for general information about this product for veterinarians and owners.

1. NAME OF THE VETERINARY MEDICINAL PRODUCT
Butorphanol solution for injection 50 mg/ml, vial 5 ml

2. QUALITATIVE AND QUANTITATIVE COMPOSITION
One ml contains:
Active substance: BUTORPHANOL 50mg
(butorphanol tartrate 73mg)
Excipients:
benzalkonium chloride
propylene glycol
ethanol
HCl (for pH adjustment)
water for injection

Solution for injection.
Clear colorless solution.

3. CLINICAL PARTICULARS
3.1 Target species
Experience with large animals like elephants, rhino's, buffalo's, but also hoof stock like antelopes, giraffes and zebra's.

3.2 Indications for use, specifying the target species
Butorphanol is used for sedation and immobilization of zoo animals, often in combination with (me)detomidine, ketamine or acepromazine by dart delivery systems.

3.3 Contraindications
Heart rhythm problems and bradycardia can be deteriorated. Intestine mobility is diminished by opiates.

3.4 Special warnings for each target species
Use in animals belonging to the family Felidae should be done with extreme care since these animals are highly sensitive to all opiate agonists and response can vary largely.

3.5 Special precautions for use
- Careful handling of the drug to prevent accidental self-injection or skin exposure
- Have running water in the near vicinity
- Wear gloves
- Use new rubbers for dart preparation
- Secure the needle tightly to the syringe
- Don't pressurize the dart without case-protection
- Always consider the darts and remaining patrons to be lethal weapons

3.6 Adverse reactions (frequency and seriousness)
Dizziness, nausea, constriction of the pupils, respiratory depression, hypotension, serious adverse events include apnea, cyanosis, coma and cardiac arrest.

The effects of butorphanol are rapidly reversed with naltrexone.

3.7 Use during pregnancy or lactation

Can be used during pregnancy and lactation. Need for intervention should be weighed against potential negative effects for fetus or suckler.

3.8 Interactions

Dosing should be adjusted based on combination with alfa-2-agonist and other sedatives or analgesics. Butorphanol blocks mu1 (μ1) and mu2 (μ2) opioid receptors, and antagonizes for this reason morphine analgesia.

3.9 Amounts to be administered and administration route

SPECIES	**MASS KG**	**Butorphanol**	**50mg/ml**	
		μg/kg	ml product /**100 kg**	Common dose (mg)
African elephant	5000	15	0.03	75
White Rhino	2000	80	0.16	160
Giraffe	1000	10	0.02	10
Okapi	250	140	0.25	35
Gazelle	25	400	0.8	10
Wild swine species	80	300	0.6	24
Zebra	250	225	0.45	56

Intramuscularly (IM) undiluted by dart.

3.10 Overdose (symptoms, emergency procedures, antidotes)

Symptoms of opiate intoxication:

- dizziness, incoordination, lethargy, sedation
- nausea, vomiting
- pin point pupil
- respiratory depression, apnea
- cold skin, weak pulse
- unconsciousness, coma
- cardiovascular collapse due to hypoxia
- death

3.11 Restrictions

None.

3.12 Withdrawal periods

At least 28 days for meat and 7 days for milk.

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4. PHARMACOLOGICAL PROPERTIES

Pharmacotherapeutic group: analgesics, opioids, morphinan derivate.
ATC-vet code: QN02AF01

4.1 Pharmacodynamic properties

Butorphanol is a mixed agonist-antagonist with low intrinsic antagonist activity at receptors of the mu1 (μ1) and mu2 (μ2) opioid type (morphine-like), which are responsible for the significant opioid side effects and also an agonist with a high affinity for kappa (κ) opioid receptors. Butorphanol is also a sigma (σ) receptor agonist, which stimulates respiratory drive. Its interactions with these receptors in the central nervous system apparently mediate most of its pharmacologic effects, including analgesia.

Butorphanol is chemically related to morphine. When given parenterally, butorphanol is 1-7 times more potent than morphine as an analgesic, depending on the test situation. Butorphanol is used as a staple medication for veterinarians in the zoo setting, administered either via IM or IV. Its analgesic properties typically take effect about 15 minutes after IM injection and last about 4 hours. For increased sedation or light anesthesia, butorphanol may be combined with sedatives such as α-adrenergic agonists (e.g., medetomidine, xylazine), tranquilizers such as benzodiazepines (e.g., midazolam, diazepam) or phenothiazines (e.g., acepromazine).
Butorphanol tartrate has proven to be relatively safe, with a high therapeutic index, and may be completely reversed rapidly with naltrexone, or partially reversed by diprenorphine (which antagonizes only the μ opioid receptors but not the κ opioid receptors).

4.2 Pharmacokinetic properties

Absorption
Following IM administration by dart: 15 minutes for analgesia.

Metabolism
Liver metabolism in inactive metabolites, excreted in urine.

Elimination
Half-life varies from <1 hour in equine species to 6 hours in feline species.

5. PHARMACEUTICAL PARTICULARS

5.1 Incompatibilities

None known. Experience with admixtures of butorphanol with ketamine, xylazine, acepromazine and medetomidine.

5.2 Shelf life

Shelf-life of the veterinary medicinal product as packaged for sale: 2 years.
Shelf-life after first opening the immediate packaging: 28 days.

5.3 Special precautions for storage

This veterinary medicinal product should be stored at room temperature, with strictly controlled, limited access.

5.4 Nature and composition of immediate packaging

Injection vial (PP amber) of 5 ml closed with a bromobutyl rubber stopper and sealed with a red aluminum cap.

5.5 Special precautions for the disposal of unused veterinary medicinal products or waste materials derived from the use of such products
Medicines should not be disposed of via wastewater or household waste. Any unused veterinary medicinal product or waste materials derived from such veterinary medicinal products should be disposed of in accordance with local requirements.

6. MANUFACTURER
Pharmacy Faculty Veterinary Medicine Utrecht University
Yalelaan 106
3584 CM Utrecht
The Netherlands

9. DATE OF REVISION OF THE TEXT
September 2025

10. CLASSIFICATION OF VETERINARY MEDICINAL PRODUCT
Veterinary medicinal product subject to prescription.

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