

# Common Anesthetic Protocols for Avian Patients

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## Pre-medication Protocols\*

Drug	Dose	Route
Glycopyrrolate	0.005 to 0.01 mg/kg	SC, IM, IV
Midazolam	0.5 to 1.0 mg/kg	SC, IM, IV, IN
Hydromorphone	0.1 to 0.2 mg/kg	SC, IM, IV
Ketamine	5 mg/kg	SC, IM
Butorphanol	0.5 to 1.0 mg/kg	SC, IM, IV

\*All doses are adjusted based on the individual needs of the patient. Some patients may need lower or higher doses. In our clinic, we usually use combinations of drugs such as midazolam, +/- glycopyrrolate, and an opioid (chosen based on species). Ketamine is generally only added in if the patient is aggressive or resistant to the drug combination that was chosen (really used very rarely). It was previously believed that “birds” primarily have kappa pain receptors therefore a mixed agonist opioid like butorphanol would be more ideal as an analgesic. Recent evidence suggests that at least in some species, full mu opioids may be more appropriate analgesics and provide better pain relief. For major surgical procedures, we are now trending more towards the use of full mu opioids and reserve the use of butorphanol for sedation and mildly painful procedures.

## Induction Protocols

Mask induction with isoflurane or sevoflurane are the most common anesthetic agents used to induce general anesthesia in birds. It is ideal to pre-medicate the patient prior to induction as this not only reduces MAC, but is also less stressful for the patient and often times the staff.

Ideally, patients should be pre-oxygenated for about 5 minutes prior to induction. After pre-oxygenation, I prefer to start the vaporizer at 1% and slowly increase the setting until the patient is in the proper anesthetic plane.

## **Injectable Anesthetics\*\***

<b>Drug</b>	<b>Dose</b>	<b>Route</b>
Propofol	4 to 8mg/kg (4 if used with benzodiazepine)	IV
Midazolam	0.5 to 1.0 mg/kg	IV
Diazepam	0.2 to 0.5 mg/kg	IV
Ketamine	5 mg/kg	IV

\*\*All doses are given slowly to effect. Some patients may need lower or higher doses based on the pre-medication protocol used, disease status, age, etc. There are few PK and PD studies on injectable anesthetics, therefore at this time, they are rarely used to induce general anesthesia. Currently inhalants are considered more reliable and “safer” to use in avian species.

## **Maintenance Anesthesia**

Patients are primarily maintained on either isoflurane or sevoflurane inhalant in oxygen. I honestly don't have a preference between the two, but isoflurane is usually cheaper than sevoflurane.

## **Air Sac Cannulation**

For patients with upper respiratory disease, upper airway obstruction, or if tracheal surgery is necessary, an air sac cannula can be placed. Birds with an air sac cannula can be induced and maintained on inhalant anesthetics via an air sac cannula.

## **Constant Rate Infusions**

<b>Drug</b>	<b>Dose</b>	<b>Route</b>
Ketamine	10 to 20 mcg/kg/min 1mg/kg loading dose	IV
Fentanyl	0.7 to 1.0 mcg/kg/min 5 to 10 mcg/kg loading dose	IV
Butorphanol	0.5 to 1.0 mg/kg/hr 0.5 to 1 mg/kg loading dose	IV
Dopamine	5 to 10 mcg/kg/min	IV

## Local Anesthetics\*\*\*

### Lidocaine:

- Can be used for local blocks at a dose of 0.5 to 1 mg/kg (very conservative doses)
- Takes a few minutes to become effective and lasts about 1 to 2 hours

### Bupivacaine:

- Can be used for local blocks at a dose of 0.5 to 1 mg/kg
- Takes about 10 to 20 minutes to become effective and lasts about 4 to 6 hours

**\*\*\*Local anesthetics can be easily overdosed. You must consider all local anesthetics administered to the patient throughout a procedure. Due to the size of most avian patients, volumes may need to be diluted to help distribute the drugs.**

## Post-operative Drug Protocols\*\*\*\*

Drug	Dose	Route
Hydromorphone	0.1 to 0.2 mg/kg	SC, IM, IV
Meloxicam	0.3 to 0.5 mg/kg	SC, IM, IV
Butorphanol	0.5 to 1.0 mg/kg	SC, IM, IV

\*\*\*\*Doses may need to be adjusted based on the specific needs of the individual. If appropriate for the patient, meloxicam is a good multi-modal approach to post-operative pain management when used with an opioid. The meloxicam can be given prior to anesthetic recovery, but the opioid is generally given once the patient is a little more awake.