

RECOVERY

PROCEDURE

1. Confirm completion of surgical procedure
2. Consider the pet's analgesia needs and redose if indicated
3. Consider the pet's sedation needs post-operatively
4. Turn anesthetic vaporizer off
5. Empty reservoir bag with pop-off valve open and increase O₂ flow to 3 - 5 L/min
6. Continue to supply O₂ for 5 - 10 minutes prior to disconnecting pet from circuit (continue to monitor EtCO₂ while pet is connected)

Continually monitor all parameters

7. Confirm recovery kennel is prepared
8. Ensure adequate number of team members are available to safely move pet
9. Deflate ET cuff when the swallow reflex is present and extubate (see considerations for brachycephalic pets)
10. Monitor and record SpO₂, temperature, pulse and respiratory rate until normalized
11. Remove ECG leads and BP cuff when values have returned to normal
12. Continue to supply O₂ if SpO₂ <93-95%

CRITICAL VALUES FOR ANESTHETIC RECOVERY

Parameter	Goal
HR	60 - 100 bpm: Medium - large dogs 80 - 120 bpm: Small dogs 90 - 160 bpm: Cats
BP	Mean (MAP) 60 - 90 mm Hg
	Systolic (SAP) 90 - 140 mm Hg
	Diastolic (DAP) 50 - 60 mm Hg
SpO ₂	95 - 100%
Pet status	Sternal, pain controlled, oriented to environment
RR	Eupneic
Temperature	100 - 102.5° F
ECG	Normal sinus rhythm
CRT	<2 seconds
MM color	Pink
Pulse quality	Strong, synchronous

CLINICAL ESSENTIAL

Continuously measure temperature, heart and respiratory rates, blood pressure, ECG, SpO₂, end-tidal CO₂ (with capnography capability). Document at a minimum of every five minutes (or more frequently as clinically indicated) for every general anesthetic event from the time of induction until full recovery.



PREVENTION/PREPARATION

- Anticipate pet analgesic and sedation needs
- Empty pet's urinary bladder at end of procedure
- Follow recovery protocol to prevent, identify and treat hypoxemia
- Consider sedation, either pre-emptively or have acepromazine and/or dexmedetomidine ready if needed

SPECIAL CONSIDERATIONS FOR BRACHYCEPHALIC PET RECOVERY

- Brachycephalic breeds are especially prone to upper airway obstruction in the post-anesthetic period
 - They should be recovered slowly in a quiet space
 - They should be placed in sternal recumbency
- The ET tube should be kept in place as long as the pet will tolerate it
- Extubate when the patient starts chewing on the tube
- SpO₂ should be monitored at the transition from 100 percent oxygen and throughout recovery, especially after extubation
- They need to be carefully observed for evidence of upper airway obstruction after extubation
 - The team member providing anesthesia should be prepared to reintubate (induction agent, laryngoscope and ET tube) should obstruction occur

CLINICAL ESSENTIAL

Keep all patients recovering from an anesthetic procedure under visual observation at all times until full recovery



For additional information see the *Induction, Monitoring and Recovery* chapter

EMERGENCY AND EQUIPMENT

EQUIPMENT AND MEDICAL SUPPLY REQUIREMENTS

- Sterile IV catheters (male adapter plugs and tape)
- Dedicated surgical scrub
- Clean and disinfected clippers
- Permanent surgical lighting with additional supplemental lighting available (e.g., head lamp)
- Endotracheal tubes in multiple sizes, adequate for each-sized pet
- Laryngoscope (long and short blades) with functional light
- Portable pulse oximeter
- Equipment sufficient to provide monitoring for pet parameters:
 - Temperature
 - Systolic/diastolic/mean arterial blood pressure
 - SpO₂
 - Heart and respiratory rates
 - ECG
 - EtCO₂ – if hospital is equipped with multi-parameter monitor
- Anesthesia machine with *Anesthesia Machine Checklist*
- Resuscitation bag sufficient for pet size or other means to assist ventilation
- Breathing circuit appropriately sized for the pet
- Approved pet warming device for use with anesthetized or unconscious patients (circulating warm water blanket or forced air)
- Stethoscope

CLINICAL ESSENTIAL

Crash cart containing emergency drugs and equipment is readily available, in a designated place, portable, clearly labeled and appropriately stocked at all times



EMERGENCY DRUG ITEMS

The following labeled and non-expired items for providing emergency care and intervention are required should an adverse event occur. These items are to be maintained and accessible at all times when providing anesthesia to any pet:

Aminophylline	Epinephrine
Atipamezole	Flumazenil
Atropine	Furosemide
Calcium chloride 10% (or calcium gluconate)	Glycopyrrolate
Colloid fluid solution	Lidocaine 2%
Dexamethasone SP	Mannitol 20%
Dextrose 50%	Naloxone
Diphenhydramine injection	Nitroglycerin paste
Dopamine	Sodium bicarbonate
Ephedrine	Sterile water for injection

EMERGENCY DRUG DOSING

Drug		Low Dose	High Dose	Notes
Atropine 0.54 mg/mL		0.02 mg/kg	0.04 mg/kg	
Dexamethasone SP 4 mg/mL		1 mg/kg	4 mg/kg	Use low dose initially
Diphenhydramine 50 mg/mL		1 mg/kg	2.2 mg/kg	Maximum dose 1 mL (50 mg)
Dopamine 40 mg/mL		1 mcg/kg/min	10 mcg/kg/min	Administer as CRI
Epinephrine 1 mg/mL		0.01 mg/kg	0.2 mg/kg intratracheal (IT)	Dilute IT dose and administer via red rubber catheter
Glycopyrrolate 0.2 mg/mL		0.005 mg/kg	0.01 mg/kg	
Lidocaine bolus 20 mg/mL	Canine	2 mg/kg	4 mg/kg	Maximum dose 8 mg/kg
	Feline	0.2 mg/kg	N/A	Maximum dose 1 mg/kg

REVERSAL AGENTS

Drug		Low Dose	High Dose	Notes
Atipamezole 5 mg/mL		100 mcg/kg	Equal to amount of dexmedetomidine administered if dose was higher than 10 mcg/kg	Alpha-2 adrenergic agonist reversal
Butorphanol 10 mg/mL		0.05 mg/kg	0.1 mg/kg	Opioid (full mu-agonist) partial reversal
Flumazenil 0.1 mg/mL		0.01 mg/kg	Repeat every hour if needed	Benzodiazepine reversal
Naloxone 0.4 mg/mL		0.04 mg/kg	N/A	Opioid reversal Highest affinity for mu receptor