

ANESTHETIC MONITORING

MONITORING ESSENTIALS					
Procedure	TPR, CRT, MM Color and Pulse Quality	BP, ECG, Pulse Oximetry	Oxygen	IV Catheter and Fluids	Sterile Eye Lubrication
Sedation	Required if not ambulatory	As directed by veterinarian	Flow by if necessary	As directed by veterinarian	As directed by veterinarian
Brachycephalic-specific sedation	Required if not ambulatory	Pulse oximetry required; BP and ECG as directed by veterinarian	Flow by required	As directed by veterinarian	As directed by veterinarian
Immobilization	Required along with anesthetic depth until full recovery	BP and pulse oximetry required; ECG as directed by veterinarian	Either flow by or inhaled via endotracheal tube required, depending on depth of sedation / anesthesia	Recommended for all immobilized pets; catheter required for propofol	Required and repeated as needed
General anesthesia	Required until full recovery	All required with TPR, capnography as able per hospital	Inhaled oxygen via endotracheal tube	Required	Required and repeated as needed

Continuous monitoring of required parameters should always be performed; documentation in the anesthetic medical record should occur at minimum of every five minutes or more often as indicated for quality patient care and when medically indicated. Any parameter that is continuing to worsen or is refractory to treatment warrants aborting elective anesthesia procedures and recovering the patient as quickly as possible.

SUMMARY OF ANESTHETIC MONITORING ASSESSMENTS		
Parameters	Subjective	Objective
Anesthetic depth	Eye position	BP EtCO ₂ MAC
	Palpebral reflex	
	Withdrawal reflex	
	Jaw tone	
	Movement	
Blood glucose	Difficult to assess in anesthetized pets	Intraoperative monitoring for at-risk pets Target level 70 – 180 mg/dL
Circulation	CRT	ECG BP
	Cardiac auscultation	
	Peripheral pulse palpation	
Oxygenation	Mucous membranes	SpO ₂
Temperature	N/A	Rectal temperature (regional blood flow and relative changes) Distal esophagus temperature probe (core temperature)
Ventilation	Chest wall movement	Blood gas analysis EtCO ₂
	Excursion of reservoir bag	
	Thoracic auscultation	

CLINICAL ESSENTIAL

Assign at least one hospital associate with the sole responsibility of dedicated, continuous patient monitoring and recovery to every immobilization and general anesthetic procedure. If there is not a trained, dedicated associate, the procedure must be rescheduled.



CRITICAL VALUES

Parameter	Goal
HR*	>60 Medium – large dogs >80 Small dogs >90 Cats
BP	Mean (MAP) 60 – 90 mm Hg
	Systolic (SAP) 90 – 140 mm Hg
	Diastolic (DAP) 50 – 60 mm Hg
SpO₂	95 – 100%
EtCO₂	>35 and <55 mm Hg with normal capnogram
RR	7 – 15 bpm
Temperature	100 – 102.5° F
ECG	Normal sinus rhythm
CRT	<2 seconds
MM color	Pink
Pulse quality	Strong, synchronous

*Without dexmedetomidine. With dexmedetomidine, HR may be 50 – 60 bpm in dogs but can be as low as 30 – 40 bpm. HR with dexmedetomidine in cats may be 90 – 100 bpm but can be as low as 80 bpm.

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

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INTERVENTIONAL MODALITIES FOR ANESTHETIC MONITORING

Parameter	Complication	Techniques to Consider		
Anesthetic depth	Depth is too light	Rebreathing	Increase vaporizer and increase O ₂ to 3 – 4 L/min	
			Manually ventilate	
		NRB	Administer propofol 0.5 – 1 mg/kg IV over 15 seconds	
			Increase vaporizer setting Consider manual ventilation	
Circulation	Bradycardia – AV block	Administer anticholinergic if concurrent hypotension		
	Sinus Tachycardia	Investigate underlying cause (pain, hypoxia, etc.)		
	VPC	If HR >150 – 180 and hypotense, lidocaine 2 mg/kg IV (canine) or 0.25 mg/kg (feline)		
Ventilation	Increased EtCO ₂ (hypercarbia)	Check anesthetic depth, lower inhalant (remember analgesia)		
		Check machine and breathing circuits		
		Provide IPPV		
	Decreased EtCO ₂ (hypocarbia)	Provide PPV at 4 – 6 bpm at peak inspiratory pressure of 15 – 20 cm H ₂ O Check BP and manage hypotension		
Oxygenation	SpO ₂ <95 (hypoxemia) depends on cause	Check O ₂ supply, flowmeter, machine and breathing circuits Preoxygenate with 100% O ₂		
		Check intubation and provide 100% O ₂ with IPPV		
		Remove air / fluid from pleural space if present		
		Provide 5 – 10 minutes O ₂ after discontinuing inhalant		
		Increase FIO ₂ to 100%		
Temperature	Hypothermia	Prewarm prior to induction		
		Warm IV fluids and patient warming device		
		Warm saline lavage (104 – 107° F) in body cavity		
		Minimize anesthesia and surgical times		
		Warm scrub; use sterile saline rather than alcohol		
	Hyperthermia	Remove warming devices		
		Actively cool, apply ice packs		
		Administer supplemental O ₂ (50 – 100 mL/kg/min) Consider acepromazine* for vasodilation		
Blood glucose	Hypoglycemia <70 mg/dL	Administer 2.5 – 5% dextrose in balanced electrolyte IV		
		Continue to monitor		
Blood pressure	Hypertension	Evaluate anesthetic depth		
		Administer supplemental analgesics		
		Consider increasing inhalant		
	Hypotension	Decrease inhalant anesthetic depth (remember analgesia)		
		Administer anticholinergic drugs if bradycardic		
		IV fluids	crystalloids 5 – 10 mLs/kg	
			colloids 2 – 5 mL/kg	
			hypertonic saline 2 – 4 mL/kg	
		Ephedrine	0.05 – 0.1 mg/kg IV	MUST monitor ECG
Dopamine	1 – 10 mcg/kg/min CRI			
Dobutamine	1 – 10 mcg/kg/min CRI			

*Remember maximum acepromazine dosages.

Content is derived from *Anesthesia and Analgesia for the Veterinary Practitioner: Canine and Feline*.