**Humane Society Laboratory (10/08)**

**Anesthesia Protocol**

Anesthesia Equipment/supplies:

Each station should be set up with the following:

Anesco compact anesthesia machine (filled with isoflurane)

Oxygen hoses and active evacuation hoses

Patient breathing circuit with a rebreathing bag.

Laryngoscope/blades

Intravenous catheters

Roll gauze

Cuffed endotracheal tubes (low pressure high volume cuffs with Murphy eye)

Lactated Ringers solution (1 L)

Fluid administration set (10 drops per ml or 60 drops per ml))

Normal saline solution

Medical adhesive tape (1 inch)

Anesthesia record

Clipboard

Clippers

Chlorhexidine scrub

Chlorhexidine solution

2x2 gauze sponges

Esophageal stethoscope/earpieces

Sterile ophthalmic lubricant

Triple antibiotic ointment or betadyne ointment

Dry gauze

Band-aids

Syringes (1, 3, and 10 ml)

Hypodermic needles

Drug labels for syringes

**Drugs:**

The following will be supplied:

Premedication:

Medetomidine (0.010 mg/kg) **or** Dexmedetomidine (0.005 mg/kg) IM

Nalbuphine (0.5 mg/kg) IM

Acepromazine (0.03 mg/kg. Maximum dose = 2 mg/dog) IM

Induction Agent:

Propofol (10 mg/ml): dosage: 6 mg/kg IV.

Inhalation agent

Isoflurane dosage: administered to effect: The expected induction vaporizer setting is 2-3% and the maintenance vaporizer setting is expected to be 1.25-2.5%. Expected oxygen flow rate is between 1 and 2 liters/min at induction and between 500 and 1 L/min during maintenance (See formula below).

Post operative pain medications:

Nalbupine (0.5 mg/kg IM)

Meloxicam (0.2 mg/kg IV or SC; may be repeated at 0.1 mg/kg SC in 24 hours) OR carprofen (2-4 mg/kg SC)

Incisional block (recommended):

Dilute 0.5% bupivacaine w/epinephrine (1 mg/kg) 1:1 with normal saline (final concentration 0.25% for infiltration anesthesia. The surgeon may administer the block after closure of the body wall, but before closure of sc/skin.

Technique: Incisional block will be done in a sterile manner by the surgeon (make sure the needle and syrine are handled sterilely). Inject local anesthetic in a fanlike manner to block subcutaneous and muscular tissues. Anesthetic should be injected down to the peritoneum for full block. Repeat injections until the area under the whole incision has been infiltrated.

**Procedure and Evaluation**

1. Find your assigned table, dog, and animal weight. Calculate doses of anesthetic drug. Have your calculations confirmed by a clinician. These drugs used for premedication should be drawn up separately, but may be mixed together in a single syringe for intramuscular injection. Draw up propfol for induction. ***Your anesthetic record should be completed in ink.***
2. Complete a physical examination on your patient. Record findings on anesthesia record.
3. Administer premedication drugs. Dogs should be returned to their cage after premedication and 15-20 minutes should be allowed before attempting to catheterize the animal.
4. Assemble supplies and equipment.
	1. Select the most appropriate endotracheal tube for the patient.
	2. Check the integrity of the endotracheal tube and cuff.
	3. Check the integrity of the anesthetic circuit. Assemble the anesthetic circuit; attach the oxygen and evacuation sources, and pressure check the system (30 cm H2O) for 15 seconds. The candidate should also check the level of isoflurane in the vaporizer.
	4. Fresh gas flows/Anesthetic circuit: The student will operate the circle system in a semi-closed fashion.

*Generally, oxygen flow rates of 22-44 ml/kg/min are considered to be acceptable maintenance flow rates for a semi-closed circle system. Alternatively, the candidate may calculate maintenance flow based upon estimated oxygen consumption x 3 (10 ml/kg/min x 3). (Lumb and Jones’ 1996)*

*Fresh gas flow is expected to be higher during anesthetic induction and recovery. In general, a fresh gas flow rate of 1-2 L/min will be considered acceptable during induction.*

1. Fluid flow rate: appropriate flow rate for crystalloid fluids during the anesthetic period should be calculated: 10 ml/kg/h for the first hour of anesthesia, 5 ml/kg/h thereafter. Lactated Ringer’s solution is an example of a replacement fluid that may be used in the laboratory.
2. The premedicated animal will be placed on the table and restrained for catheter placement.
3. The catheter site (cephalic) will be clipped and aseptically prepared.
4. An over-the-needle catheter will be inserted into the vein, and a T-port will be connected to the catheter.
5. The catheter and attached T-port will be taped into place and a sterile band-aid with triple antibiotic ointment (or betadyne ointment) will be placed over the percutaneous puncture site.
6. Prior to injection of an induction agent, the catheter will be assessed to insure that it not placed extravascularly. Pulsatile injection of sterile normal saline solution will be used for this purpose. Alternately, withdrawal of blood may be used.
7. The animal should be assessed briefly prior to induction general anesthesia. Specifically, a final check of pulse rate/quality and mucous membrane color should be performed just prior to induction of anesthesia. Any abnormalities should be called to the attention of your instructor.
8. Propofol should be infused intravenously and to effect. The student should plan on administering the drug at a rate that would allow for the entire volume to be administered over 1-1.5 minutes.
9. The mouth of the dog should be held open by the assistant, and the tongue pulled forward using a gauze square.
	* 1. The tongue should be moved outside the mouth using the endotracheal tube or laryngoscope blade (i.e., the anesthetist should not place his/her hands between the teeth).
		2. The tongue should be pulled rostrally and between the mandibular canines.
		3. The laryngoscope blade should be pressed against the base of the tongue. This will pull down the epiglottis and expose the larynx. The laryngoscope may be used directly on the epiglottis if it done in a GENTLE fashion.
		4. The endotracheal tube should be advanced into the mouth, through the larynx, and into the trachea.
		5. The length of the tube should be checked to insure that it is just cranial to the thoracic inlet.

*A laryngoscope is recommended for your initial attempts at intubation. It will greatly improve visualization of the larynx.*

1. The dog should be placed in lateral recumbence, and the endotracheal tube should be connected to the anesthetic machine and the oxygen turned on (1-2 L/min).
2. The pulse/heart beat should be assessed.
3. The anesthetist should secure the endotracheal tube to the animal (over the nose or behind the head) using the roll gauze provided.
4. The endotracheal tube cuff should be inflated after listening for a leak during manual ventilation to ~20-25 cm H2O. Air should be added to the cuff in relatively small increments (1-3 ml) until a leak can no longer be detected during manual ventilation.
5. The vaporizer should be turned on to 2-3%.
6. The animal’s respirations, pulse rate and depth of anesthesia should be monitored in a relatively continuous fashion. Entries should be made onto the anesthesia record provided every 5 minutes.
7. The esophageal stethoscope should be placed for monitoring heartbeat and respirations.
8. Crystalloid fluids (lactated Ringer’s solution) should be connected and adjusted to 10 ml/kg/h (rate may be cut in half after the first hour).
9. Eyes should be lubricated with sterile ophthalmic lubricant.
10. The animal will next be prepared for surgery (positioning/clipping/skin preparation).
11. Anesthetic and oxygen flow should be adjusted to maintenance levels when appropriate (5-15 min after induction).
12. At the completion of the surgical procedure, postoperative drugs may be administered as outlined above. (Nalbuphine and meloxicam)
13. Your anesthetic record must be completed and turned in to your supervisor.
14. Dogs should be observed intermittently until they are able to maintain sterna recumbence.
15. Intravenous catheters should be removed prior to discharge of the dog to the humane society