Practical Use of Tubes and Drains

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Thoracostomy tubes

Tube drainage of the thorax is indicated to drain free air or fluid in the pleural space. This is not an absolute indication as small amounts of air within the thorax do not require a thoracostomy tube. Similarly, the presence of blood within the pleural space is not usually an indication for thoracic drainage.

Closed thoracic drain placement

Two most common indications would be for animals with pneumothorax that is causing dyspnea and is usually caused by trauma or spontaneous pneumothorax (rupture of a pulmonary bleb or bulla). A second indication would be free pleural fluid; i.e. Pyothorax Drainage of free pleural fluid such as chyle may be performed short term only; long term drainage of chylous effusion will lead to hypoalbuminemia.

- 1. The animal is usually anesthetized. If the animal is dyspneic, needle thoracentesis initially followed by stabilization for short time may make the animal a better anesthesia candidate. If absolutely necessary, a tube can be put in with heavy narcotic sedation and local blocks.
- 2. Place the animal in lateral recumbency and prep the hemithorax for aseptic placement of the tube.
- 3. Make a small skin incision at the mid to upper 1/3rd of the thorax; a subcutaneous tunnel is created over 2-3 intercostal spaces rostrally in a cranioventral direction. This tunnel may be made with a Kelly hemostat or with the trocar/stylet that comes on many commercial thoracic tubes.
- 4. The hemostat or stylet is used to penetrate the 7th or 8th IC space and is briskly thrust through the IC muscle. If a hemostat is being used and the patient is a larger dog using a scalpel to penetrate the IC muscle will make the job much easier. In smaller patients a forceful thrust is necessary to enter the pleural space.
- 5. Obvious caution is used when a stylet is used; the non-dominant hand is used as a safety "stop" to protect against penetrating lung or heart.
- 6. The size of the tube should be that of the main stem bronchus, in cats that usually means a tube 12-16 french in dogs it may be 18-24 french.
- 7. The tube is fed into the cranial ventral thorax and then secured to the skin with a "Chinese finger cuff" suture. Antibiotic ointment is placed around the skin entrance and a bandage applied to protect the tube.
- 8. Either intermittent or continuous suction drainage is used to drian air or fluid.
- 9. An adaptor and 3-way valve are attached to the tube and secured with wire or glue. BE CERTAIN that personnel know how to operate the 3-way valve.
- 10. Drains may remain in hours to days depending on their use and how much drainage is being obtained.

Open drain placement post-thoracotomy

- 1. Similar to what is described above but easier since you can visualize the tube in the thorax. The tube should enter the thorax outside the primary intercostals incision.
- 2. Secure as above. Often pulled early in the postop course.

Cystostomy tubes/catheters

Cystostomy catheters can be used to divert urine from the urinary bladder on either a temporary or permananent basis. Indications include injury to the lower urinary tract such as torn or ruptured urethra, neurologic bladder, or obstructive disease caused by cancer such as transitional cell carcinoma of the bladder or proximal urethra.

- 1. General anesthesia required. Abdomen is prepped for aseptic surgery.
- 2. A limited approach is made to the caudal abdomen and the bladder located and a stay suture placed to manipulate the bladder.
- 3. A purse-string suture is placed in the bladder using 2/0 or 3/0 PDS.
- 4. A small incision is made lateral to the abdominal incision and a Foley cather or Pezzar feeding tube brought through the small incision and then placed through a stab incision that is made in the middle of the purse-string suture.
- 5. Tie the purse-string suture snugly.
- 6. Place 2-3 supporting sutures between the bladder wall and the abdominal wall.
- 7. Close the abdomen routinely.
- 8. Connect the catheter to a closed urinary system or alternatively the bladder can be drained intermittently by hospital personnel or the owner at home.
- 9. If the need for the catheter improves then the catheter can be removed and the stoma heal by second intention.

Gastrostomy tube placement Surgical

Required= Feeding tube (Pezzar catheter)

- 1. Place a purse-string suture in the mid-body of the stomach.
- 2. Make a "stab-incision" through the middle of the purse-string and bring a Pezzar mushroom tipped urinary catheter through the left abdominal wall (caudal to the last rib) into the abdominal cavity and through the middle of the purse-string into the gastric lumen. Tighten the purseting.
- 3. Place traction on the feeding tube and place supporting stomach to abdominal wall sutures to "pexy" the stomach. PDS, Maxon, or Prolene suture is used for the "pexy" sutures.
- 4. Bandage the tube in place.
- 5. In general, the tube should remain in place about 14 days before attempts at removal .
- 6. Remove as described below or cut off tip and retrieve the tip with endoscope if available.
- 7. Allow the abdominal wall exit wound to heal by second intention.

Non-Surgical

Equipment required=Eld Gastrostomy Tube applicator (Jorgenson Labs Inc.), mouth gag, Pezzar urinary catheter, #8 red rubber urinary catheter.

- 1. Place the anesthetized animal in right lateral recumbency.
- 2. The area for tube placement is 1-2 cm caudal to the last rib and 1/3rd the distance from the epaxial musculature to the ventral midline. Prep a generous area, and place the mouth gag on the right canine teeth.
- 3. The Eld device is passed aborally and gently rotated so that the curve is pointed laterally and then the tip pushed against the stomach and against the side of the animal.
- 4. The trocar tip is extended through the stomach wall and through the skin and a long length of Vetafil threaded through the tip and pulled orally out the esophagus.
- 5. Tie the Vetafil to a #8 urinary catheter, cut the tip of the Pezzar catheter and pull the two conjoined catheters back through the esophagus into the stomach and then gently but firmly pull the two tubes out the abdominal wall. Place a flange on the feeding tube and secure to the body wall.
- 6. Feed blenderized diet through the tube 3-4 times daily.
- 7. Tube should remain in a minimum of 14 days. Tube may be removed by cutting the tube to 3-4 cm in length and inserting a metal stylet into the tube. The stylet is used to extend (flatten) the flange on the tube and firm traction placed on the tube to extract it from the stomach. Allow the abdominal wall exit wound to heal by second intention.

Esophagostomy tube placement

Equipment required=Mouth gag, Cook E-tube or #10 red rubber feeding tube. Curved Kelly or Carmalt hemostat, Mixter forcep (right angled) or Eld device. The tip of esophageal feeding tubes should ideally be placed in the terminal esophagus (not cross the gastroesophageal junction). Premeasure the feeding tube and mark it by placing it against the animal marking it at about the 7th-9th rib (Xiphoid process). Advantage of the tube is its ease of placement and the lack of laryngospasm, gagging, and aspiration that can occur with pharyngostomy tubes.

- 1. Place the animal in right lateral recumbency and clip and prep the animal's neck on the left side. Either side may be used but the left is preferred.
- 2. Place the mouth gag on the right canines and insert the curved hemostat into the proximal esophagus and pass it laterally to distend the skin. A small skin incision is made and the forceps BLUNTLY advanced through the esophageal wall. The tip of the feeding tube is grasped and drawn back out the oral cavity.
- 3. The tip is then redirected aborally and passed distal to its correct position in the esophagus. Putting tension on the tube or use of a sylet as you redirect aborally helps in "straigtening" the tube as you pass it down the esophagus. Alternatively, Dr. Norsworthy reports that he is successful in redireting the tip down the esophagus without drawing it out the oral cavity.
- 4. Confirm the location of the tip of the catheter with a lateral thoracic radiograph.
- 5. Secure the feeding tube with a "Chinese finger-trap suture" and lightly bandage the tube to the neck.
- 6. Feed the animal with bolus feeding every 2-4 hours, initially then decrease to 4x daily. Start at 1-4 ml/kg body weight and increase to 10-12 ml/kg body weight (Max 60 ml). Give the bolus slowly over 5-15 minutes. Typically, we use A/D diet or Feline Clinicare. Both have caloric concentrations of 1.2 kcal/ml and we feed 200-300 kcals daily.
- 7. Flush the tube with 5-10 ml of water before and after each feeding.
- 8. Owner should keep stoma clean and apply triple antibiotic ointment locally.

The tube may be maintained for a prolonged time or it can be removed at any time. Allow the exit wound to heal by second intention. This is an economic, safe, and effective method for providing long-term nutritional support to cats. Substantial complications with the method including esophageal stricture have not been reported.

Wound drains

Most veterinarians are aware of Penrose drains, a form of passive drainage used for wounds and abscess treatement. They have the advantage of being cheap but work only by gravity and need to be covered by a bandage.

Please note that Active Drains (Jackson-Pratt and Snyder) are available that provide continuous suction drainage to wounds. They cost more but are extremely effective and very useful for large traumatic skin wounds and in preventing seroma formation. Terrific drain system for amputations where seemingly seromas are a threat.