Surgery of the Trachea and Diaphragm

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This presentation will discuss the more common surgical problems of the trachea and diaphragm in the dog and cat.

Laryngeal paralysis is a common problem affecting older large breed dogs. While it is very gradual in onset and signs may have been developing for some time, these patients often present with an acute onset of life threatening dyspnoea. The syndrome is due to degeneration of the recurrent laryngeal nerve and is always associated with a generalised polyneuropathy. Diagnosis is based on history, signalment, clinical signs and observation of laryngeal movement under light anaesthesia.

In acute cases, initial stabilisation can often be achieved with sedation, steroids and fan cooling. If the dog doesn’t settle then they can be anaesthetised and intubated for some time. Options then are to gradually wake them up for a later surgery or go ahead with surgery prior to recovery.

The most common surgery is a laryngeal tieback. The larynx is approached laterally and the thyroid cartilage retracted. The paralysed muscle is replaced with sutures from the caudal aspect of the cricoid to the muscular process of the arytenoid cartilage. This is an awkward dissection for those unfamiliar with the area, and if keen to try this surgery I would recommend going to watch one done by someone experienced and or do a few cadaver dissections to become familiar with the anatomy. The other problem in practice is the post-operative monitoring during the first 2 days as aspiration pneumonia is a common complication, as these patients also have poor upper oesophageal function. The prognosis for return to function is good.

Tracheostomy is a salvage procedure for upper air obstruction. When needed it may be very urgent so practitioners should familiarise themselves with the technique. While a dedicated tube is a better shape, any suitable ET tube can be used.

An emergency tracheostomy may be necessary. The emergency procedure is merely a rapid longitudinal incision down to the trachea. The trachea is grasped and a horizontal cut made between the rings and a tube thrust in.

If intubation via the mouth is possible a tracheostomy can be done carefully to facilitate recovery. A few patients such as severely affected brachycephalics can be intubated, but will need a tracheostomy for recovery.

One of the important procedures is to pull the ventral strap muscles apart and pull them together again dorsal to the trachea. This pulls the trachea out to the skin.
An indwelling tube is quick, but requires constant supervision to prevent a mucous plug obstructing the tube.

An “H” flap tracheostomy can be done to create a temporary or permanent stoma. A horizontal incision is made then a flap created cranially and caudally and sutured to the skin. No tissue is removed which allows for subsequent closure if appropriate. A tube is not needed, although initial close supervision is still required.

Trauma to the trachea is not common but can be devastating. Bite wounds to the neck may create leaking wounds leading to dramatic subcutaneous emphysema. The best treatment is to create large drainage holes so the air can escape, creating drainage and then managing as an open wound. Iatrogenic tearing of the dorsal ligament due to over inflation of the ET tube cuff is something to be wary of and discuss with nurses. These cases also develop subcutaneous emphysema. Many can be managed conservatively, but some will need surgical repair.

Tracheal rupture will occasionally occur in cats due to car trauma. The trachea is usually disrupted in the cranial chest. Signs may develop a few days after trauma and an apparent narrowing of the trachea can be seen radiographically. Surgical repair requires anastomosis via a right lateral thoracotomy.

Collapsing trachea is common in small breed dogs. While many cases can be managed medically, the more severe cases will need more intervention. Extraluminal support rings were previously the accepted treatment, but now intraluminal stenting is the usual treatment. Stenting is much less traumatic but still leaves some long term problems.

Diaphragmatic hernia is common after severe trauma. While many cases are clinically obvious on examination and radiography some will present with a late onset of signs.

Surgery may be critically urgent in cases where the stomach is herniated and distress leads to distention of the stomach with air (tension gastrothorax). In most cases surgery should be carried out as soon as practical.

Some cases of traumatic diaphragmatic hernia present a long time after the trauma. The animals present with dyspnoea due to pleural effusion. This is usually due to herniation of a liver lobe, then stricture of the hernia ring impeding venous and lymphatic return.

Congenital diaphragmatic hernia may become apparent at almost any stage of life. They are usually a peritoneal-pericardial herniation that may become symptomatic as more abdominal contents move cranially or for instance as a lipoma develops in herniated omentum.

Hiatal hernia is protrusion of some of the stomach cranially through the oesophageal hiatus. It usually affects brachycephalic dogs which present with regurgitation. Diagnosis can be frustrating as the hernias are dynamic. A barium swallow using fluoroscopy may be needed or multiple radiographs.

Surgery to repair a hiatal hernia requires reduction of the hernia, plication of the oesophageal hiatus, oesophagopexy and a left flank incisional gastropexy. Addressing upper air obstruction in affected brachycephalic dogs is also helpful.

Specific needs of some cases will be discussed.