RECOMMENDATIONS
conversations with a cardiologist

CARDIAC EDUCATION group

May 2024

Approach to the Dyspneic Feline Patient

Dyspneic cats can be challenging to diagnose and manage because of their fragility and level of stress/anxiety when acutely dyspneic. Rapid stabilization, diagnosis and appropriate management can be life-saving. Although some acutely dyspneic cats have congestive heart failure, other causes of acute tachypnea/dyspnea may include feline asthma, pleural effusions unrelated to heart failure, or trauma of the airways or thorax. The following represents the consensus of the CEG for approach and management of the acutely dyspneic feline patient.

Dyspnea in cats may result from airway obstruction, pulmonary diseases, pleural space disorders, or congestive heart failure (CHF). Immediate differentiation of these problems may NOT be possible, but all acutely dyspneic feline patients can be approached using the following guidelines:

Initial Patient Management

Cats with dyspnea of any etiology are often extremely anxious and fragile due to their respiratory distress. These patients may deteriorate rapidly; provision of oxygen and minimization of handling are priorities. All unstable patients should be stabilized prior to any radiographic imaging, but if available, thoracic point-of-care ultrasound may be a helpful and low stress way to expedite diagnosis and treatment in a cat with respiratory distress.

- Oxygen may be supplied via oxygen cage, by mask or through “flow-by” techniques (where oxygen via tube is provided near the cat's face).
- Many cats in respiratory distress benefit from anxiolysis. Frequently, butorphanol (0.2 to 0.3 mg/kg) alone will decrease overt anxiety when administered IM in cats. In more fractious patients, butorphanol combined with acepromazine (0.03 to 0.05 mg/kg) and administered IM provides mild to moderate sedation while having minimal cardiovascular depressant effects. Acepromazine should NOT be used in hypotensive or hypothermic cats. The clinical staff should be ready to perform tracheal intubation and positive pressure ventilation should life-threatening dyspnea be evident and respiratory arrest imminent. Obvious laryngeal or tracheal stridor or loud noise associated with breathing may indicate airway obstruction that can be temporarily managed with induction of anesthesia and tracheal intubation if not improved with sedation alone.
- Indirect sources of heat (water circulation pads, warmed fluid bags) may be helpful in cats with subnormal body temperature, but aggressive heating (e.g. use of a Bair Hugger™) should be avoided.

Discerning the Cause of Dyspnea/Respiratory Distress

The clinician should try to determine the anatomic "level" of disease responsible for abnormal ventilation.

- Airway obstruction should be suspected if the history or physical examination reflects trauma of the neck, if inspiratory (or combined inspiratory-expiratory) stridor is present, if there are loud respiratory noises audible without a stethoscope, or if mucous membranes are cyanotic in a gasping animal. Pulmonary auscultation in these patients often reveals harsh inspiratory sounds reflected from the upper airways. Panting is usually NOT associated with airway obstructions.

- Pulmonary bronchial or parenchymal disease as a cause of acute dyspnea in cats is often due to feline asthma; clinical signs may include acute dyspnea, cyanosis, panting, and wheezing. There may be a history of cough and obvious pulmonary crackles if inflammatory pulmonary infiltrates are present. Cats with asthma seldom have jugular distention or evidence of pleural effusion. Other causes of respiratory distress in cats include pneumonia, pulmonary neoplasia, and noninfectious, inflammatory lung diseases. Infiltrates affecting a single lung lobe typically reflect pulmonary disease rather than CHF. These often have historical clues and a long history of clinical signs. Thoracic trauma should also be considered in patients with acute dyspnea.

- Pleural effusions including chylothorax are common in cats with CHF. Idiopathic chylothorax, pyothorax, and neoplasia involving the mediastinum, lung, or pleura are other causes of pleural effusion. Clinical signs associated with pleural effusion include rapid ventilation (with or without increased depth), muffled heart sounds, and an audible or percussible fluid line characterized by absence of clear breath sounds in the more ventral lung fields. The presence of jugular distention indicates that the effusion is more likely due to CHF (or excessive volume loading, as in cats receiving fluid therapy). If breath sounds are evident in dorsal lung fields, but heart sounds are muffled, the clinician should consider both impaired heart contractility and pericardial effusion in the differential diagnosis. If an ultrasound unit is available, pleural effusion may be rapidly diagnosed with limited imaging of the thorax (see below).

- Congestive heart failure should be suspected in a dyspneic feline patient if there is evidence of heart disease (murmur or gallop sound, arrhythmia, jugular venous distension, pulmonary crackles, increased or decreased breath sounds) on the physical examination. The physical diagnosis of CHF can be challenging when affected cats do not have an obvious heart murmur or arrhythmia. Thoracic point-of-care imaging, if available, can be helpful to increase the suspicion of heart failure as the cause of clinical signs. Although the underlying heart disease may be long- standing, cats with CHF can be presented acutely with no premonitory signs of heart disease prior to decompensation. A point-of-care SNAP™ NT-proBNP can be helpful to confirm or refute a diagnosis of CHF.

THORACIC POINT-OF-CARE ULTRASOUND IS AN IMPORTANT, LOW-STRESS IMAGING TOOL TO HELP DIAGNOSE THE CAUSE OF THE CAT'S RESPIRATORY DISTRESS.

Imaging

- Point-of-care thoracic ultrasound of the heart, lungs and pleural space can provide timely and useful information while the cat is being gently restrained in sternal recumbency and receiving oxygen. Ultrasound can be used to quickly identify or exclude these key findings in dyspneic cats: 1) pleural effusion; 2) pericardial effusion (usually caused by CHF in cats); 3) left atrial dilatation and 4) vertical lung ultrasound artifacts ("B-lines"), created by an air/fluid interface that is present when intrapulmonary fluid is present. The ratio of left atrial:aortic diameter in the short axis view is > 1.5 (and usually > 2) in cats whose clinical signs are due to CHF, and when B-lines are present in an dyspneic patient with left atrial enlargement, CHF is likely.

- Thoracic radiographs are an important diagnostic test for all patients with dyspnea once clinical stabilization has been achieved. Radiographs can be used to assess heart size, vascular size and assess for the presence of pulmonary infiltrates or pleural effusion. Note: radiographic diagnosis of CHF in cats can be challenging because of the variable pulmonary patterns present in heart failure. Pulmonary venous distension and left atrial enlargement are often difficult to identify in cats with CHF, but generalized cardiomegaly is often appreciated.

- Echocardiography is recommended in confirmed or suspected CHF patients after initial stabilization. Echocardiography may also be helpful in patients with pulmonary infiltrates or pleural effusion in which the cause remains uncertain after initial assessment.

Lung ultrasound image showing numerous B-lines in a cat with cardiogenic pulmonary edema. B-lines are the hyperechoic (white) vertical artifacts that originate from the pleural-pulmonary interface, do not fade in the far field, obliterate A-line and move with respirations. B-lines represent decreased aeration in the lunges and are not specific for cardiogenic pulmonary edema.

Dorsoventral and lateral projection thoracic radiographs of a cat with cardiogenic pulmonary edema. The lungs have a diffuse increased interstitial to alveolar opacity. The borders of the heart are difficult to discern due to overlying pulmonary infiltrates, but the heart appears to be enlarged.

Acute Management of the Dyspneic Cat

- Airway obstruction: Rapid anesthestic induction and intubation may be required to stabilize patients with life-threatening upper airway obstruction. Supplemental oxygen should be provided at all times. For non-life-threatening upper airway obstruction, mild sedation is helpful to decrease patient stress, but preparations for tracheal intubation should be made prior to administration of the sedative.

- For suspected feline asthma, use a pediatric spacer and a standard albuterol inhaler; administer two "puffs" of albuterol into the spacer and allow the cat to breathe through the mask for 10 to 15 seconds; two puffs may be repeated in ~10 minutes. A positive response (easing of dyspnea) should be to provide presumptive diagnosis of reactive bronchospasm. If the response is incomplete, but reactive airway disease is strongly suspected, a single dose of terbutaline sulfate (0.1 mg/kg SQ) can be administered. If response to airway dilators is positive, administer short-acting glucocorticoids and oral or subcutaneous airway dilators (and continue using inhaled albuterol 2 to 3 times daily until stabilized). Dexamethasone sodium phosphate (0.1 mg/ kg IV or IM) is used for its anti-inflammatory effects.

- Thoracocentesis should be performed if large volume pleural effusion or pneumothorax is strongly suspected or confirmed with ultrasound imaging or radiographic. Ideally, thoracocentesis should be performed prior to radiographic imaging as a method of stabilization in the severely dyspneic patient. Thoracocentesis often requires some degree of sedation. Ultrasound assistance or guidance is often helpful. For a therapeutic centesis, removal of fluid can continue until dyspnea eases or until the maximal amount of fluid can be removed. This can often usually be accomplished with draining of the fluid from one hemithorax because most cats have an incomplete mediastinum but sometimes, bilateral centesis may be required. In patients with CHF as a cause of pleural effusion, furosemide (1-2 mg/kg IV or IM) can be administered for additional therapy of CHF after thoracocentesis has been performed but is NOT a substitute for thoracocentesis in severely affected patients.

- For suspected or confirmed pulmonary edema, administer parenteral furosemide (2 mg/kg IV or IM), and oxygen. Additional doses of furosemide (1-2 mg/kg IM) may be administered every 1-2 hours, as needed to relieve acute pulmonary edema, but the risk of prerenal azotemia and hypokalemia increases with repeated dosing of furosemide. Careful observation of respiratory rate can be used to monitor response to therapy so that excessive furosemide dosing can be avoided. Nitroglycerine paste (¼ inch of 2% ointment applied to inside of pinna) may be useful but efficacy of this therapy has not been proven. Close monitoring of respiratory rate is noninvasive and extremely helpful in judging response to acute therapy; the patient's respiratory rate should progressively decline with therapy. If no change in respiratory rate is noted after 1-2 doses of furosemide and provision of oxygen, re-evaluation for causes of dyspnea other than CHF should be considered.

FOR MORE INFORMATION ON DIAGNOSIS AND MANAGEMENT OF FELINE CARDIOMYOPATHY, SEE ACVIM CONSENSUS STATEMENT GUIDELINES FOR THE CLASSIFICATION, DIAGNOSIS, AND MANAGEMENT OF CARDIOMYOPATHIES IN CATS

TO LEARN MORE OR SIGN UP FOR OUR NEWSLETTER, VISIT cardiaceducationgroup.org

CARDIAC EDUCATION group

The CEG is funded through an educational grant from Boehringer Ingelheim Vetmedica, Inc., IDEXX Laboratories, Inc. and Nestle Purina PetCare.