Why is this patient dyspneic?

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Dyspnea is the sensation of having difficult or laborious breathing. It is a subjective phenomenon that needs to be inferred by the clinician in companion animals. Dyspnea, tachypnea (rapid breathing), and hyperpnea (increased ventilation) are not synonymous but are frequently grouped together in veterinary patients. Dyspnea occurs when the demand for ventilation is out of proportion to the animal's ability to respond to this demand. Thus, breathing becomes difficult, uncomfortable, or labored. Dyspnea may result from alterations in any portion of the respiratory system or be due to abnormal mechanics of the lung and chest wall (Figure 1).

When does the Dyspnea occur?

The timing and pattern of respiration helps to determine the structure most likely responsible for the dyspnea. Dyspnea may occur during inspiration, expiration or both (mixed). Clinically, pure inspiratory dyspnea implies a lesion in the respiratory tract outside the thorax, whereas expiratory and mixed dyspneas occur in patients with thoracic or metabolic disease.

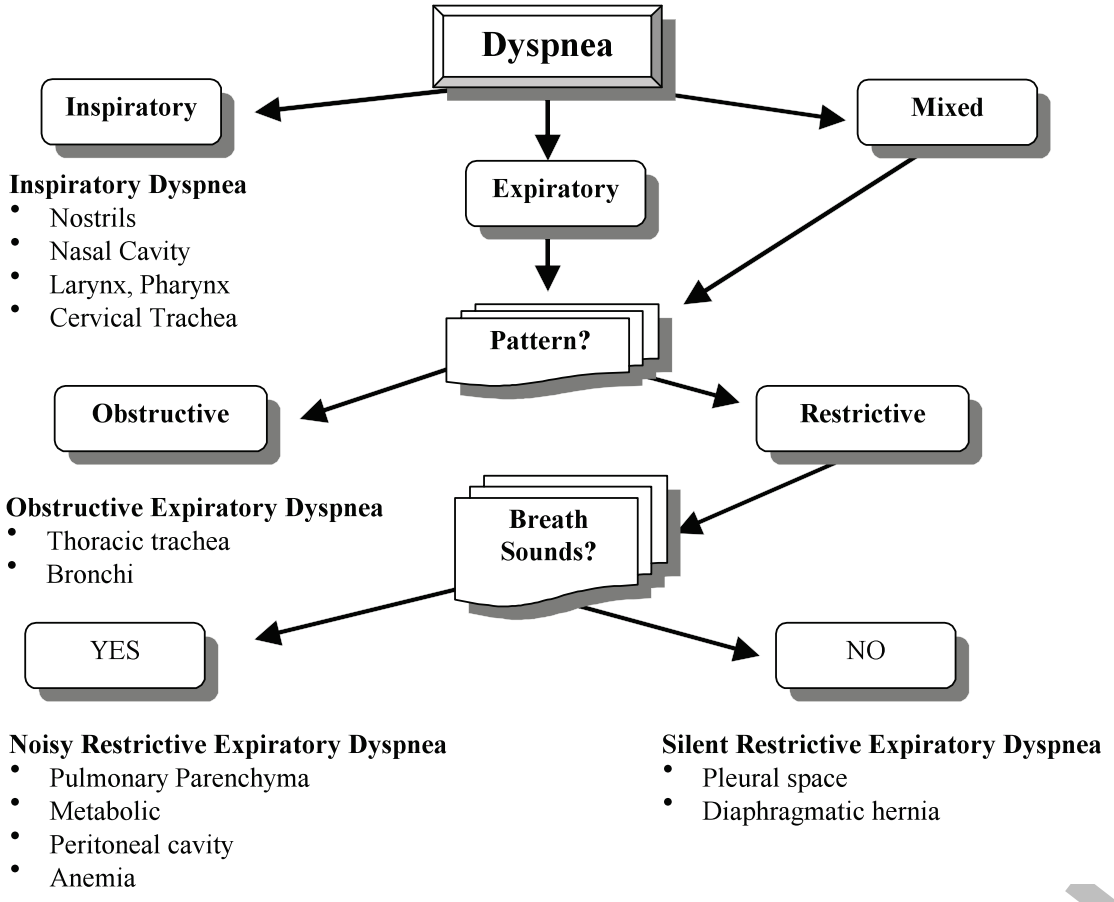

Figure 1 – Localizing the origin of the dyspnea

What is the pattern of respiration?

Mixed or expiratory dyspnea should be further classified as obstructive or restrictive. *Obstructive diseases* are associated with increased airway resistance in the tracheobronchial tree. Obstructive diseases may also occur in the upper respiratory tract, but those patients have inspiratory dyspnea. Patients with obstructive disease have decreased expiratory flows and hyperinflated lungs (e.g.; cats with asthma). *Restrictive diseases* are those in which expansion of the lungs is restricted (e.g.; pulmonary fibrosis, pleural effusion). Lungs of patients with restrictive disease operate at smaller volumes and the patient has a rapid shallow breath. In patients with a non-pulmonary cause of restrictive, residual volume is normal or increased.

Can you hear Respiratory Sounds?

The physical examination assists in identifying the cause for the dyspnea. In patients with restrictive pulmonary disease, absence of respiratory sounds indicates a pleural cavity disease, whereas presence of pulmonary sounds occurs in patients with parenchymal pulmonary disease, metabolic diseases or abdominal distention.

Inspiratory Dyspnea

Inspiratory dyspnea occurs with extrathoracic lesions in the respiratory tract (table 2). Patients with isolated pure nasal problems are able to breathe normally when the mouth is open. Presence of abnormal respiratory sounds may help to localize the problem. *Stridor* is a loud musical inspiratory sound of constant pitch associated with laryngeal (and occasionally tracheal) alterations. *Rhoncus* is a rattling in the throat associated with pharyngeal or proximal tracheal diseases. *Cough* may occur in patients with inspiratory dyspnea. Cough receptors are located in the larynx, pharynx, and large airways. Diseases in any of those locations may be associated with cough. In patients with extrathoracic disease, cough is usually paroxystic and loud. Direct visual inspection or bronchoscopy is necessary determine the cause.

Table 2. Causes of Inspiratory Dyspnea

Nostrils	*Nasal Cavity*
Stenotic nares	Foreign bodies
	Nasal Mass
	Rhinitis
Larynx/Pharynx	*Cervical Trachea*
Elongated soft palate	Tracheal collapse
Caudal palate	Tracheitis
Laryngeal paralysis	Parasites
Laryngeal edema	Extraluminal compression
Everted laryngeal sacules	Foreign body
Laryngeal laceration/trauma	
Laryngeal neoplasia	
Hyoidal fracture	
Retropharyngeal polyps	

Obstructive Expiratory Dyspnea

Obstructive expiratory dyspnea occurs in patients with intrathoracic airway diseases (table 3). Patients may have wheezes and cough. *Wheezes* are continuous musical sounds generated by air forced to pass through a narrow region abruptly into a wider region in the larger airways. Good quality chest radiographs and tracheal wash are necessary to rule in or rule out specific diagnosis.

Table 3. Causes of Obstructive Expiratory Dyspnea

Thoracic Trachea	*Bronchial tree*
Tracheal collapse	Bronchitis
Tracheobronchitis	Asthma
Extraluminal compression	Extraluminal compression
Foreign body	Neoplasia
Neoplasia	Lymph nodes
	Enlarged left atrium

Silent Restrictive Expiratory Dyspnea

Silent restrictive expiratory dyspnea occurs in patients with pleural cavity disease (table 4). Pulmonary sounds are absent or may be heard at specific locations (e.g. dorsal lung fields in patients with pleural effusion). Cough is usually absent. Chest radiographs and thoracocentesis are necessary to rule in or rule out the differentials.

Table 4. Causes of Silent Restrictive Expiratory Dyspnea

Pleural Cavity
Pneumothorax
Pleural effusion
Diaphragmatic hernia
Chest tumors

Noisy Restrictive Expiratory Dyspnea

Noisy restrictive expiratory dyspnea occurs in patients with parenchymal pulmonary diseases (table 5). Pulmonary sounds are audible and abnormal sounds like crackles might be heard. *Crackles* are short, explosive, non-musical sounds that are a non-specific sign of small airway disease. Cough may occur if small airways are also involved and is usually not loud. Chest radiographs and tracheal wash or bronchoalveolar lavage are necessary to rule in or rule out the differentials.

Table 5. Causes of Noisy Restrictive Dyspnea

Pulmonary Parenchyma	*Abdominal distension*
Edema	Ascites
Pneumonia	Pregnancy
Fibrosis	Organomegaly
Neoplasia	Gastric dilatation-volvulus
Hemorrhage/contusion	Neoplasia
Embolism	
Metabolic	
Anemia	
Anxiety/Fear	
Metabolic acidosis ?	

Careful interpretation of the information obtained in the history and physical examination determining the timing and pattern of the dyspnea allow the veterinary practitioner to anatomically locate the origin of the dyspnea in most cases. Direct inspection visually or endoscopically, radiographs, and cytology are necessary to determine the cause of the dyspnea.

References

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