RESPIRATORY MEDICINE

Diagnostic Approach to the Coughing Cat

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The coughing cat presents a clinical challenge. Coughing is a nonspecific clinical sign, and differentials include infectious conditions such as viral, bacterial, and parasitic disease; neoplasia; and noninfectious feline lower airway disease (FLAD), which includes classic feline asthma, bronchiectasis, and chronic bronchitis. Cardiogenic disease rarely causes coughing as a primary clinical sign in cats but should remain a differential.

Initial assessment of patient signalment, history, and physical examination findings should consider patient lifestyle risk factors; the character of the cough; the presence of pyrexia; respiratory rate and effort; and 4-quadrant lung auscultation for abnormal sounds such as crackles, wheezes, or rales. If the patient is in respiratory distress, all other diagnostics must wait until the patient has been stabilized. In emergent cases, or those in which cost constrains a full diagnostic workup, therapeutic drug trials may be necessary.

Cats with FLAD often have lung hyperinflation and a diffuse bronchial or bronchointerstitial pattern, resulting in a classic “donut” or “tram line” effect due to bronchial wall thickening.

In all other cases, thoracic radiography is the next essential step in the diagnostic workup of a coughing cat. Assessment of lung pattern and distribution of pattern can quickly narrow the differential list. Cats with FLAD often have lung hyperinflation and a diffuse bronchial or bronchointerstitial pattern, resulting in a classic “donut” or “tram line” effect due to bronchial wall thickening. Radiographically, parasitic disease may appear similar. Cats with pneumonia may be more likely to present with an interstitial to alveolar lung pattern that is most likely to affect the ventral lung fields.

Blood analysis is useful to evaluate a patient's overall health status, and heartworm antibody and antigen testing should be performed as part of this assessment. Approximately 14% to 40% of cats with FLAD may have peripheral eosinophilia on CBC.[1,2] Eosinophilia on CBC should increase suspicion for FLAD or parasitic causes of cough. A neutrophilic inflammatory leukogram is more commonly encountered in cases of infection.[3]

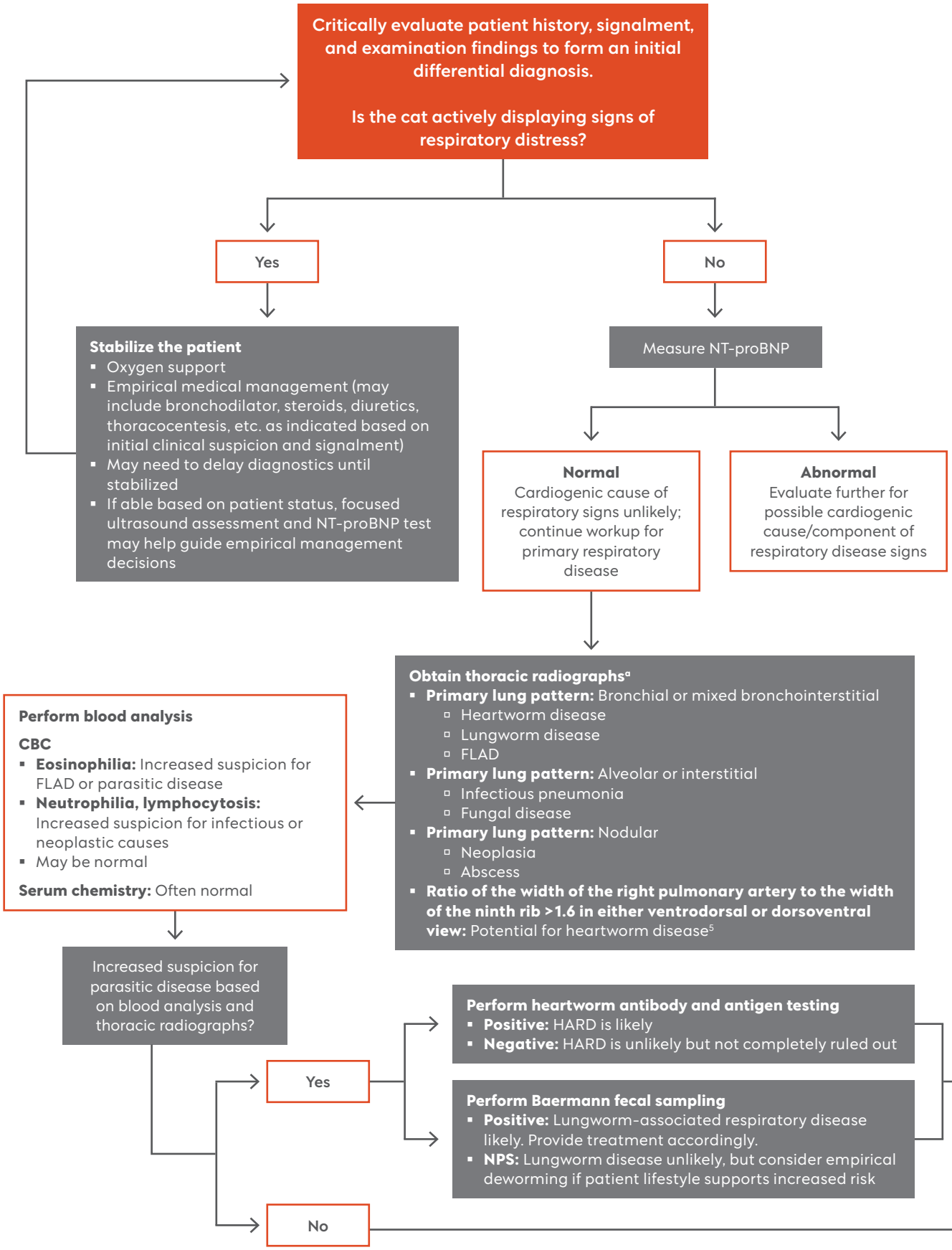
If the patient is clinically stable, the next diagnostic step after obtaining an initial radiographic assessment and establishing overall health status is lower airway sampling. Blind bronchoalveolar lavage (BAL) techniques are well described in the literature, are readily accessible, and show similar sample quality to that of bronchoscopically guided techniques.[4] Fluid sample evaluation includes cell count, cytology, and culture. Cats in significant respiratory distress are not candidates for BAL. Evaluation of NT-proBNP (N-terminal pro–B-type natriuretic peptide) level at the start of the diagnostic workup for a coughing cat can be useful in decreasing clinical suspicion for cardiogenic disease as a differential and establishing stability for undergoing anesthesia for BAL.

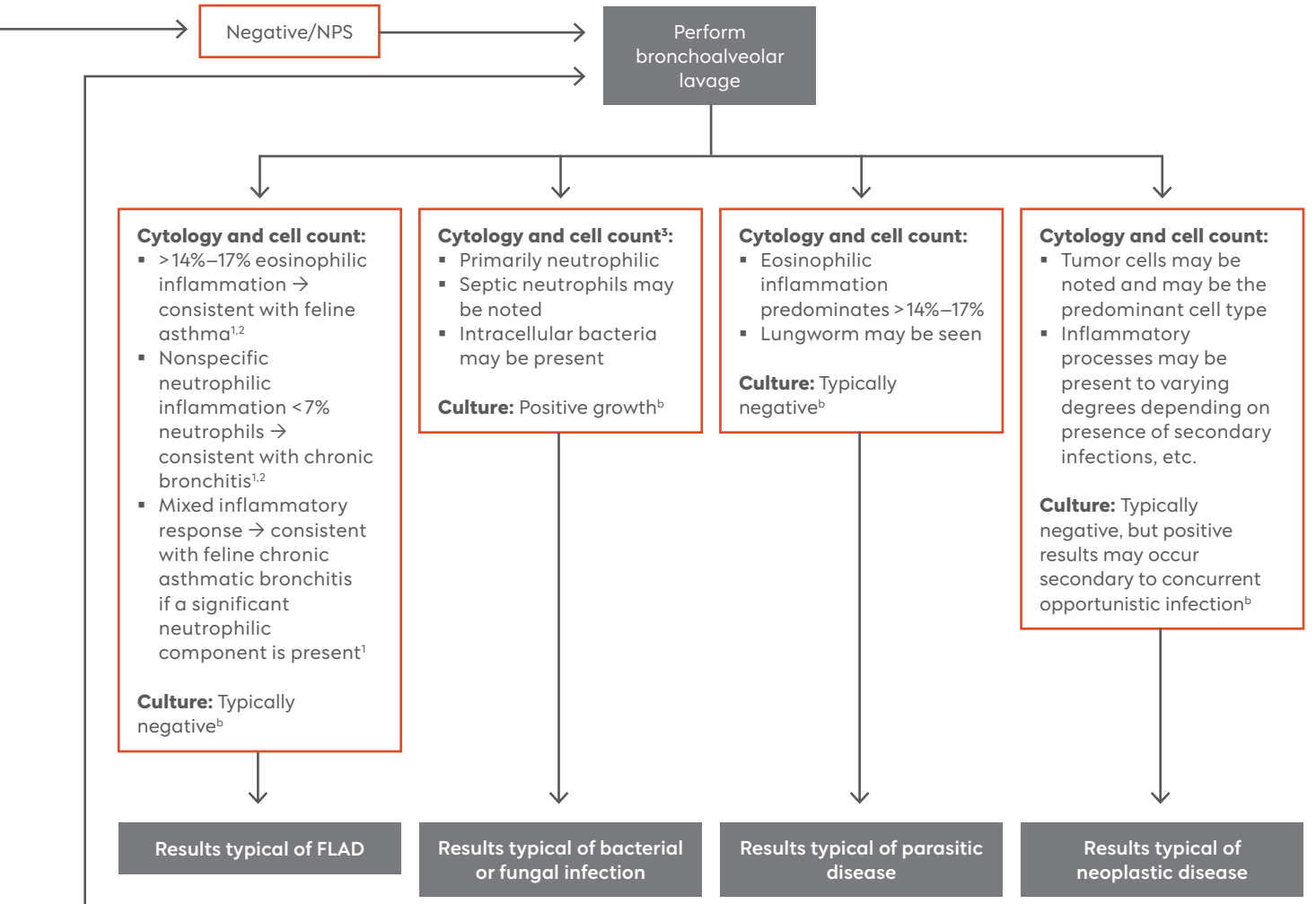
BOX 1
Diagnostic Database for the Coughing Cat*

1. **Clinical assessment**
   - **a.** Physical examination findings
   - **b.** Patient history
   - **c.** Patient signalment
2. **Thoracic radiography**
3. **Blood analysis/serology**
   - **a.** CBC
   - **b.** Serum chemistry panel
   - **c.** Heartworm antibody and antigen testing
   - **d.** Feline NT-proBNP
4. **Bronchoalveolar lavage**
   - **a.** Cytology
   - **b.** Cell count
   - **c.** Culture
5. **Other**
   - **a.** Baermann fecal sampling for lungworm suspicion
   - **b.** Fungal testing in endemic regions if radiographic signs are consistent

NT-proBNP = N-terminal pro–B-type natriuretic peptide.
**While obtaining a comprehensive database is preferred, ancillary diagnostics can be tailored based on the increase in clinical suspicion at each step.*

Developing a streamlined but comprehensive diagnostic approach that considers patient clinical history, physical examination findings, radiographic evaluation, blood analysis, parasite testing results, and lower airway sampling is essential to obtaining an accurate diagnosis (**BOX 1**) and informing an effective therapeutic plan.


Critically evaluate patient history, signalment, and examination findings to form an initial differential diagnosis.
Is the cat actively displaying signs of respiratory distress?
Yes
No
Stabilize the patient
Oxygen support
Empirical medical management (may include bronchodilator, steroids, diuretics, thoracocentesis, etc. as indicated based on initial clinical suspicion and signalment)
May need to delay diagnostics until stabilized
If able based on patient status, focused ultrasound assessment and NT-proBNP test may help guide empirical management decisions
Measure NT-proBNP
Normal
Cardiogenic cause of respiratory signs unlikely; continue workup for primary respiratory disease
Abnormal
Evaluate further for possible cardiogenic cause/component of respiratory disease signs
Obtain thoracic radiographs[a]
Primary lung pattern: Bronchial or mixed bronchointerstitial
Heartworm disease
Lungworm disease
FLAD
Primary lung pattern: Alveolar or interstitial
Infectious pneumonia
Fungal disease
Primary lung pattern: Nodular
Neoplasia
Abscess
Ratio of the width of the right pulmonary artery to the width of the ninth rib >1.6 in either ventrodorsal or dorsoventral view: Potential for heartworm disease[5]
Perform blood analysis
CBC
Eosinophilia: Increased suspicion for FLAD or parasitic disease
Neutrophilia, lymphocytosis: Increased suspicion for infectious or neoplastic causes
May be normal
Serum chemistry: Often normal
Increased suspicion for parasitic disease based on blood analysis and thoracic radiographs?
Yes
No
Perform heartworm antibody and antigen testing
Positive: HARD is likely
Negative: HARD is unlikely but not completely ruled out
Perform Baermann fecal sampling
Positive: Lungworm-associated respiratory disease likely. Provide treatment accordingly.
NPS: Lungworm disease unlikely, but consider empirical deworming if patient lifestyle supports increased risk



FLAD = feline lower airway disease; HARD = heartworm-associated respiratory disease; NPS = no parasite seen; NT-proBNP = N-terminal pro–B-type natriuretic peptide.
[a]These are only general guidelines. Other patterns may be seen, and other conditions may cause coughing in cats. For example, a cat with severe chronic bronchitis may have an alveolar component.
[b]Oropharyngeal contamination may yield false-positive bronchoalveolar lavage culture results. Critically consider positive results within clinical context.

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Dr. Gagne received her veterinary degree from Iowa State University's College of Veterinary Medicine and completed her American Board of Veterinary Practitioners residency in canine and feline practice at Weare Animal Hospital in New Hampshire. She is a member of the Feline VMA, ASV, AVMA, and IVAPM with special interests in cardiology, respiratory disease, and shelter medicine. Dr. Gagne is currently serving as the Director of Veterinary Services for Salem Animal Rescue League, a nonprofit organization dedicated to promoting animal welfare, reducing pet overpopulation, and providing access to veterinary care for underserved communities in the area.