



The coughing dog with a heart murmur – the ‘cardiac cough’

A cough has been historically reported as a major clinical sign of an enlarged heart pressing on the airways and congestive heart failure due to cardiogenic pulmonary oedema in dogs. However, recent evidence has shown that this is incorrect, and the ‘cardiac cough’ doesn’t actually exist! While cough and heart disease often occur at the same time, they are not necessarily linked. Unfortunately, the profession has been slow to accept this change in thinking, after all we were **all** taught about the cardiac cough, and so the dogmatic approach is still being presented as fact by eminent members of the profession. The human medical profession has accepted this change over the last decade and now a cough is cited as a less typical sign of congestive heart failure in international guidelines. Adding to the frustration of trying to distinguish between the causes of cough (airways, the lungs, or the heart), the very animals predisposed to myxomatous degenerative mitral valve disease are also predisposed to some of the most common non-cardiogenic causes of cough (e.g., tracheal collapse, chronic bronchitis, bronchomalacia).

The cardiac cough is false!

Approximately 50% of dogs with mitral valve disease present with coughing, often referred to as “cardiac cough” and its mechanism is frequently explained in different ways. The most common erroneous explanation is the presence of pulmonary oedema, as often reported in textbooks and historically inappropriately reinforced in veterinary education. However, a cough reflex cannot be evoked in the deeper respiratory tract (respiratory bronchioles or alveolar space) where pulmonary oedema occurs, because there are no cough receptors at this level. Instead, the presence of fluid in these areas will almost inevitably cause tachypnoea and/or dyspnoea (Ferasin et al, 2013).

Another explanation is the mechanical stimulus of bronchial cough receptors caused by the enlarged heart (and in particular the enlarged left atrium, which lies just beneath the main stem bronchi). However, puppies with significant congenital cardiac defects and severe cardiomegaly rarely present with coughing. Since airway disease is more commonly observed in older dogs, cardiomegaly may be a more likely cause of cough in patients with pre-existing airway disease, due to a summative stimulation of coughing receptors caused by the two co-morbidities, compared with young individuals that have a healthy respiratory system. Indeed, left atrial enlargement is associated with an increased risk of cough in dogs with mitral valve disease, and there is a ten-fold increased risk of coughing if left atrial enlargement and airway disease coexist, even when pulmonary oedema is absent (Ferasin et al, 2013, Ferasin 2017, Johnson & Pollard 2010).

Therapeutic trials for ‘cardiac’ cough often produce a positive response even though the cough is not caused by pulmonary oedema. This is because a diuretic will shrink the heart so it will be pressing less on the airways and furosemide has been shown to act as an anti-inflammatory and antitussive (Prandota 2002).

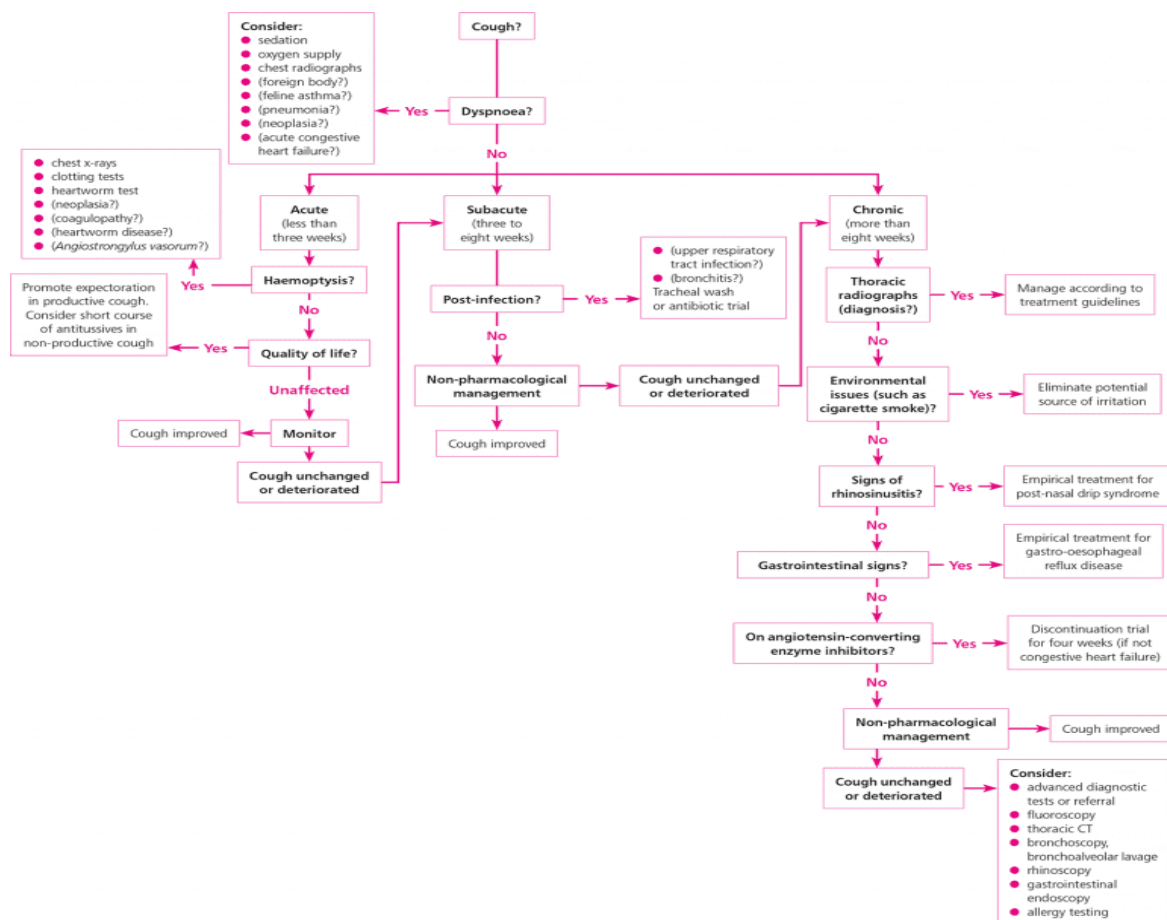
Therefore, the term ‘cardiac cough’ should be considered a misnomer, since coughing originates from the airways, even in cardiac patients.

Causes of cough in dogs

Cough may have many potential inciting causes and can present a challenging medical diagnosis – the causes of cough are many and can be difficult to test for conclusively, and additionally increased nerve

sensitivity can cause a cough to occur with very little disease or stimulation. Coughing is due to mechanical or irritant effect within the airways (trachea and larger bronchi), though cough may also occur with parenchymal and pleural space disorders. The history and the physical examination are the most important features in helping distinguish between them. Thoracic radiograph is probably the most important diagnostic test following thoracic auscultation. Carefully interpretation of radiographs can probably exclude a significant number of the differentials for chronic coughing. To reduce the cough, we should look for causes of cough and treat this if possible:

- Airway foreign body
- Lungworm
- Infectious tracheobronchitis, viral and secondary bacterial
- Tracheobronchomalacia – tracheal and/or bronchial collapse
- Chronic bronchitis
- Tumours affecting the larynx, trachea, lungs and mediastinum, and other mass-occupying lesions
- Post-nasal drip
- Environmental irritants
- Gastro-oesophageal reflux especially in brachycephalic breeds
- ACE inhibitors – reported widely in people but possible in dogs.





The dog is still coughing!

If thoracic radiography is normal (so ruling out neoplasia, static tracheal collapse) and the owner declines further investigations (endoscopy, CT or fluoroscopy, broncho-alveolar lavage) or the cough is chronic and not particularly bothering the dog or owner then the following management actions can help reduce the cough:

- Reduction of weight until the patient is in the correct BCS.
- Use of a harness not a collar and lead.
- Reduction of irritants in the environment - no smoking in the house, stop the use of sprays and diffusers in the house, reduce dust and the use of house cleaning products.
- Cover dog bed with cotton sheet and wash weekly to reduce house dust mites.
- Cool-mist humidifiers near where the dog sleeps, especially in winter (£20-30, available widely) - cough may be worse initially as it softens and loosens mucous which is then coughed up but longer term these help reduce mucous build up and cough.
- Controlled exercise - walking not running, helps clear mucous.

Cough is a protective mechanism and should never be suppressed, with the exception of persistent coughing interfering with exercising, eating, drinking and sleeping, and, therefore, affecting the patient's quality of life.

If improvement is not observed with the above conservative management, medications can be considered though there is a lack of scientific evidence for their use:

- Inhaled corticosteroid such as fluticasone.
- Trial of antibiotics if chronic bronchitis suspected e.g. 14 days of doxycycline.
- Cough suppressants such as butorphanol and codeine.
- Bronchodilators such as theophylline, terbutaline and salbutamol.

Conclusions

The historical assumption, and still taught by some, that the cardiac cough is a sign of pulmonary oedema or cardiomegaly alone needs to be reviewed. The cardinal sign of acute heart failure in dogs is tachypnoea and/or dyspnoea, not a cough. Therefore, the most accurate way of monitoring for the onset of congestive heart failure is for owners to monitor resting respiratory rate (Schober et al 2010) and by suggesting that the onset of a cough would signify congestive heart failure may lead to dogs being incorrectly or mis-identified. We should think twice before starting treatment for heart failure merely based on whether a dog coughs.



References

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Resources

<https://thetalph.vet/library-learning/cpd-in-a-nutshell-myths-and-legends-of-the-coughing-dog/> a useful video summarising this

<https://www.veterinary-practice.com/article/the-coughing-dog-with-a-heart-murmur>

<https://www.vettimes.co.uk/article/coughing-dogs-myths-and-legends/>