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Clinical Article

TRACHEOBRONCHOSCOPY IN A TWELVE-YEAR-OLD POMERANIAN

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SUMMARY

A twelve-year-old female Pomeranian was presented with a history of paroxysmal coughing since the past two months. Radiographs revealed reduced tracheal diameter at the cervical and thoracic inlet region. Confirmatory diagnosis of grade II tracheal collapse with concurrent grade I bronchomalacia was documented with tracheobronchoscopy. Bronchoalveolar Lavage Fluid (BALF) cytological, microbiological and biochemical analysis was crucial in the diagnosis and deciding appropriate medical management consisting of antitussives, bronchodilators, corticosteroids, antibiotics etc. in resolving the signs and symptoms.

Keywords: Bronchoalveolar Lavage Fluid, Bronchomalacia, Dogs, Tracheal collapse, Tracheobronchoscopy

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Tracheal collapse is a common factor contributing to cough in mature, geriatric especially small-breed dogs as per Tappin (2016). This is defined as the narrowing of the tracheal lumen, dorsal tracheal membrane prolapse, or a combination of these abnormalities (Macready *et al.*, 2007). Tracheal narrowing is a multifactorial process resulting from weakening of the tracheal cartilage due to deficiency of organic matrix. In dogs, tracheal collapse is most frequently present with some underlying conditions such as bronchitis, heart disease, bronchomalacia etc. which may exacerbate the condition, identifying these is important for the management of tracheal collapse. Grading the degree of collapse is of utmost importance to recognize the severity and extent of airway collapse, monitor the progression of the disease and for deciphering a treatment plan.

This case study discusses a case of a twelve-year-old female Pomeranian presented with a history of dry, non-productive and harsh cough since 2 months, that was exaggerated by sudden activity or excitement. On physical examination, the dog was active and alert, moderately obese and exercise intolerance was observed. Increased inspiratory effort was evident with harsh sounds audible on laryngeal and thoracic auscultation. Characteristic 'goose honking' cough could be elicited easily on palpation of the cervical trachea. Haematology revealed a stress leucogram with biochemical values in the normal range. Expiratory right lateral radiograph revealed narrowing of the tracheal lumen throughout the entire cervical area and at the thoracic inlet with an unstructured interstitial pattern. The cardiac silhouette appeared normal (Fig. 1).

Tracheobronchoscopy was performed under TIVA using Inj. Ketamine HCl (7 mg/kg weight) with Diazepam in the combination of 2:1. and the dog was premedicated with atropine (@0.04 mg/kg and deriphylline @11 mg/kg). Preoxygenation using a mask for ten minutes before anaesthesia to avoid hypoxia was also deemed necessary and included in the protocol (Johnson and Pollard, 2010).

The findings of the tracheobronchoscopy demonstrated a slightly erythematous mucosa with small amounts of mucous and a dynamic airway collapse with flattened C shaped tracheal cartilages along the whole tracheal length and the movement of dorsal membrane on expiration obstructed the airflow (Fig. 2). The tracheal diameter was reduced to approximately fifty percent of normal suggestive of grade II collapse according to Hedlund and Tangner (1983).

Grading of tracheal collapse is done based on tracheal lumen diameter, shape of the tracheal rings and anatomy of dorsal tracheal ligament (Maggiore, 2019).

Grade I describes mild collapse in which 25% of the tracheal diameter is collapsed and the grading system progresses to severe grade IV collapse in which 100% of the luminal diameter is collapsed. A concurrent dynamic bronchial collapse of the left principal and cranial bronchi (Fig. 3) was also observed with 50% reduction of bronchial lumen on inspiration and a Grade 1 bronchomalacia as per the endoscopic classification given by Bottero *et al.* (2013).

Bronchoalveolar lavage was collected from these sites and was subjected to cytological, microbial and biochemical analysis. Cytology revealed mixed neutrophilic and lymphocytic inflammation without any intracellular organisms and many activated alveolar macrophages. Microbial culture revealed the growth of *Pseudomonas* spp. that was sensitive to amikacin, ciprofloxacin, azithromycin and gentamicin in antibiotic sensitivity test, however there were no significant changes in the biochemical analysis of BALF.

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Fig. 1. Right lateral radiograph at peak expiration reveals tracheal collapse along the cervical region and thoracic inlet.

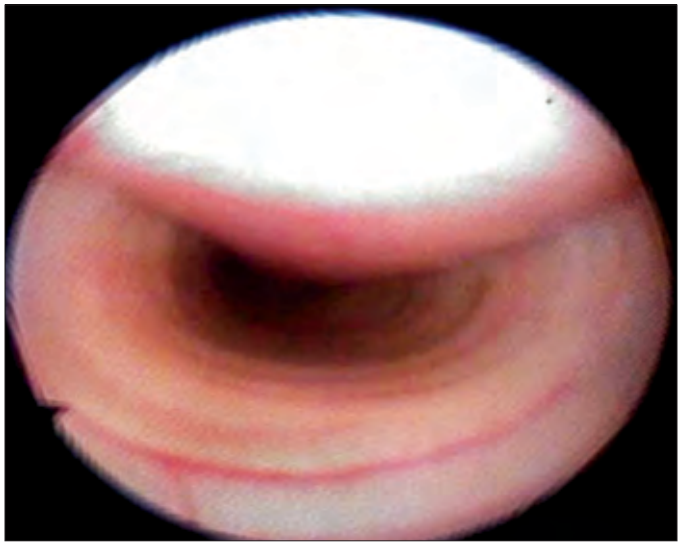

Fig. 2. Dorso-ventral tracheal ring flattening, pendulous dorsal tracheal membrane and occlusion of 50% tracheal diameter indicating Grade II tracheal collapse.

The medical treatment was mostly aimed to resolve the severity of symptoms and included antitussives (Tus QD @ 3ml tid) to reduce the dry hacking cough, prednisolone @ 0.5 mg/kg PO bid to reduce inflammation, nebulisation with salbutamol and budesonide to provide bronchodilation and anti-inflammatory effect and Azithromycin @ 10mg/kg once a day PO for 10 days. The dog was kept on a low calorie diet in order to encourage weight loss. A cool and dust free environment along with a body harness instead of a neck collar was encouraged to avoid stimulation of cough following compression of trachea with collar. The dog showed significant improvement 15 days after starting the treatment.

Thus, from this case it could be concluded that tracheobronchoscopy proved to be the gold standard for diagnosing dynamic grade II airway collapse along with canine bronchomalacia. Preoxygenation and use of Inj.

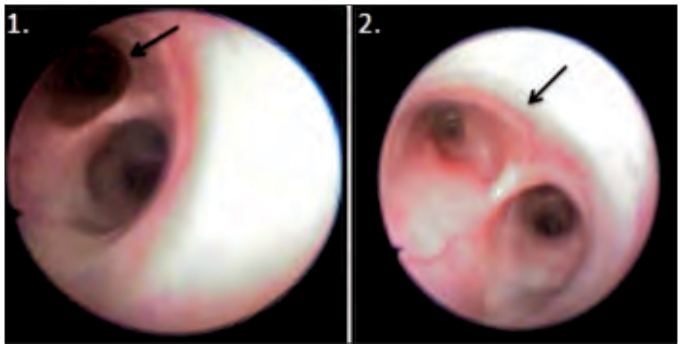

Fig. 3. **(1)** Right principal bronchi (arrow) observed during inspiration. No collapse evident. **(2)** Grade 1 Dynamic bronchial collapse evident at right principal bronchi (arrow) evident on expiration.

Deriphylline 10 minutes prior to the procedure was beneficial to avoid bronchoconstriction and bronchospasm during bronchoscopy or BAL collection procedures. Mixed neutrophilic inflammation in BALF cytology along with *Pseudomonas* spp. sensitive to aminoglycoside group of antibiotics was an observed feature in BALF microbial analysis. Aetiology of tracheal collapse in most cases is unknown, however it is likely to occur due to the deficiency of organic matrix (Calcium, chondroitin, glucosaminoglycan etc.) in the tracheal cartilage leading to the replacement of normal hyaline cartilage into fibrocartilage which causes weakening of the tracheal rings leading to collapse (Done and Drew, 1976 and Dallman *et al.*, 1998). Old age and breed predilection were found to be the main predisposing causes of airway collapse in this particular case. Surgery was not recommended owing to age as well as the anaesthetic risk involved and the improvement in the dog's condition with medical management.

REFERENCES

Bottero, E., Bellino, C., De Lorenzi, D., Ruggiero, P., Tarducci, A., D'Angelo, A. and Gianella, P. (2013). Clinical evaluation and endoscopic classification of bronchomalacia in dogs. *J. Vet. Int. Med.* **27(4)**: 840-846.

Dallman, M.J., McClure, R.C. and Brown, E.M. (1988). Histochemical study of normal and collapsed tracheas in dogs. *Am. J. Vet. Res.* **49(12)**: 2117-2125.

Done, S.H. and Drew, R.A. (1976). Observations on the pathology of tracheal collapse in dogs. *J. Small Anim. Pract.* **17(12)**: 783-791.

Hedlund, C.S. and Tangner, C.H. (1983). Tracheal surgery in the dog, Part II. *Compend. Contin. Educ. Pract. Vet.* **5**: 738–751.

Johnson L.R. and Pollard, R.E. (2010). Tracheal collapse and bronchomalacia in dogs: 58 cases (7/2001-1/2008). *J. Vet. Int. Med.* **24**: 298–305.

Macready, D.M., Johnson, L.R. and Pollard, R.E. (2007). Fluoroscopic and radiographic evaluation of tracheal collapse in dogs: 62 cases. *J. Am. Vet. Med. Assoc.* **12**: 1870- 1876.

Maggiore, A.D. (2019). An update tracheal and airway collapse in dogs. *Vet. Clin. North Am. Small. Anim. Proct.* **50(2)**: 419-430.

Tappin, S.W. (2016). Canine tracheal collapse. *J. Small Anim. Pract.* **57(1)**: 9-17.