BRONCHOSCOPIC FINDINGS IN CHRONIC RESPIRATORY TRACT DISORDERS OF DOGS

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Abstract

Bronchoscopy is a minimally invasive diagnostic imaging tool for the specific and accurate diagnosis of the respiratory tract diseases. Bronchoscopic evaluation of twelve dogs presented with a history of chronic respiratory problems were performed under suitable general anaesthesia using two anaesthetic protocols. All the animals were subjected to detailed physical, clinical and haematological examination along with blood gas, electrolyte analysis and radiographic evaluation of neck and thorax prior to bronchoscopy. The findings of the procedure were used for the specific medical therapy. The response of the treatment were assessed and further modifications/ alterations were made.

Keywords*: Bronchoscopy, respiratory tract disorders, diagnostic imaging*

Bronchoscopy is a minimally invasive procedure allowing direct visualization of the oropharynx, trachea, bronchi and bronchioles (Creevy, 2009 and Tenwolde *et al.* 2010). Identification of structural abnormalities, injuries and inflammatory conditions of the respiratory tract can be made easy with this technique (Rha and Mahony, 1999). It will help to visualize the small airways and benefits the clinician to diagnose challenging respiratory conditions which are not distinctive by routine radiographic technique (Johnson and Pollard, 2010).

Materials and methods

Twelve dogs with history of chronic respiratory disorders presented to University Veterinary Hospitals, Mannuthy and Kokkalai of Kerala Veterinary and Animal Sciences University were selected for the study. The selected dogs were designated case numbers serially from I to XII. After taking complete history, clinical examination, survey radiography (Lateral view of neck and thorax and ventrodorsal view of thorax), haematological evaluation, blood gas and electrolyte analysis and special examination of the respiratory tract were conducted prior to bronchoscopy. The patients were subjected to bronchoscopy under general anaesthesia using (1) Thiopentone

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sodium 2.5% (w/v) intravenously or (2) Propofol followed by Diazepam intravenously. Bronchoscopic evaluation was done to assess the status of oropharynx, larynx, trachea, bronchus and bronchioles and grading of the mucous in the bronchi was done.

Results and Discussion

The study revealed that both sexes were affected and the average age of onset of respiratory diseases was more than three years. White and Williams (1994) also observed that respiratory tract disorders are equally affecting both sexes and mean age of onset of diseases was four and half years (Table 1).

The history of the diseases and conditions were widely varied in nature depending on the involvement of various segments of respiratory tract. The signs exhibited by the patients with chronic respiratory diseases included dry or moist cough, partial or complete anorexia, weight loss and loss of body condition, exercise intolerance, respiratory distress, abnormal breathing pattern and breath sounds. These clinical signs were also observed by Day *et.al* (2006) which varied according to the site of occurrence either in digestive or respiratory pathway. The physiological parameters of the patients were varied and were within the normal range. (Table 1).

Observations on haematological parameters and blood gas and electrolyte analysis were performed for assessing the patient status and anaesthetic risks involved for the bronchoscopy. The haemoglobin values were below the normal range in cases I, III, VI, IX, XI and XII. Total erythrocyte count was lowered in cases III, VI, IX, and XI. Moderate Leukocytosis with neutrophilia was detected in cases II, III, IV, VII, VIII, X, and XII. Leukocytosis with increased count of lymphocytes was the finding in cases III and VI. However, depending on the necessity for bronchoscopy, the dogs were subjected to anaesthesia for the procedure.

Lateral view of neck, Lateral and ventrodorsal view of thorax were used for radiography. Radiographic evaluation later provided pre-bronchoscopic details about the underlying condition, but often failed to arrive at a definitive diagnosis in all the cases. Tracheal collapse, areas of focal consolidation of lung lobes, presence of pneumonic signs and abnormal appearance of lung parenchyma were apparent to a great extent in radiography.

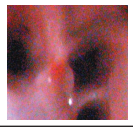
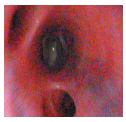
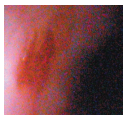
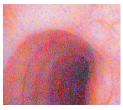
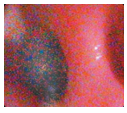
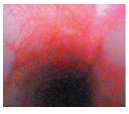
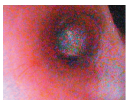
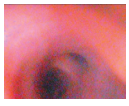
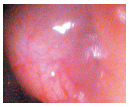
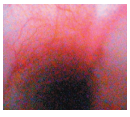
Kogan *et al.* (2008) described as similar alveolar pattern of bronchial tree involving middle lung lobes in cases of dogs with aspiration pneumonia.

Kaye *et al.* (2015) reported that visualisation

Table 1. Patient details and physiological parameters

Case No	Breed	Sex	Age	Temperature (^{0}F)	Respiratory rate/min	Pulse /min
I	Rottweiler	Male	5 years	102.5	32	67
II	Labrador retriever	Male	2.5 years	103.8	28	78
III	Cross bred	Male	3 years	101.1	16	68
IV	Spitz	Male	5.5 years	100.2	32	94
V	Labrador retriever	Female	1.5 years	103.1	16	77
VI	Spitz	Female	8 years	104.2	24	70
VII	Labrador retriever	Female	4.5 years	102.9	28	66
VIII	Rottweiler	Female	3 years	104.5	18	52
IX	German Shepherd Dog	Male	3 years	101.4	26	62
X	Labrador retriever	Female	3.5 years	102.5	28	56
XI	Cross bred	Male	2 years	103.5	16	74
XII	Cross bred	Female	1.5 years	103.1	18	92

Table 2. Observations of bronchoscopy with figures.

Case No	Bronchoscopic findings	
I	Pale grey coloured mucosa near primary tracheal bifurcation, two lines of haemorrhagic streaks with bluish grey coloured mucosa of the primary bronchial division of the right lung and pinpoint haemorrhage at the region of the fourth and fifth bronchial division of the right lung	
II	Accumulation of mucous ventrolaterally at the second bronchial division of right lung, lodgement of mucous plug at fourth bronchial division and presence of mucous plug with accumulation of clear fluid at fifth segment of bronchus.	
III	Thick patch of tracheal ulcer on the tracheal mucosa caudal to larynx on the right lateral aspect and close examination revealed an orange yellow coloured margin with central area of haemorrhage.	
IV	Invagination of tracheal lumen on right lateral aspect at midway between pharynx and carina and the stenotic portion was having a characteristic “D” shape due to occlusion of the lumen by lateral wall of trachea	
V	Severe inflammatory changes on the mucosa of the trachea near to carina at the level of thoracic inlet. Accumulation of mucous at the primary bronchial division on the left ventrolateral aspect, thick mucous plugs at third bronchial segment	
VI	Severe inflammation and thickening of Dorsal Tracheal Membrane	
VII	Bilateral inflammation and hypertrophy of the laryngeal cartilage bilaterally with engorged blood vessels, hypertrophy and thickening of dorsal tracheal membrane.	
VIII	Thick mucous was found being lodged in the primary bronchus of right lung,	
IX	A patch of the mucous material at second bronchial segment of the left lung, a diffuse pattern of hyperemia of blood vessels around the third bronchial division of the left lung.	
X	Enlargement and edema of the mucosa of the bronchial segments of left lung and total irreversible dilation and constriction of the bronchus with asymmetry of the bronchial divisions.	
XI	Haemorrhagic changes at the laryngeal cartilage and epiglottis noticed. A polyp like mass was noticed at the region of vocal cord involving the mucosa	
XII	Bilateral haemorrhagic lesions at the laryngeal cartilage, focal haemorrhagic spot on lateral wall of trachea and pinpoint haemorrhage of tracheal lumen	

and diagnosis of lesions of respiratory tract was made possible by bronchoscopy. Oropharynx, laryngeal cartilages, tracheal mucosa and tracheal cartilages, bronchi and bronchioles were systematically visualised for normal anatomy, appearance of mucosa, gross lesions, presence of mucous and grading of bronchial mucous. Mucous grading was designated as grade 0 to grade 5 depending upon the nature and presence of mucous. Mercier *et al.* (2011) reported that age related changes should be considered while arriving at a diagnosis related to respiratory diseases. The bronchoscopic findings were used for the medical therapy of the respective conditions which included chronic pneumonia (cases II, V and VIII) tracheal collapse (case IV), inflammation of Dorsal Tracheal Membrane (cases VI and VII) chronic bronchitis with haemorrhagic lesions (case I, VI, IX and XII) tracheal ulcer (case III), bronchiectasis (case X) polypoid mass (case XI). (Table 2)

Appropriate medical therapy was advised based on the findings of bronchoscopy and medicines were administered either orally or parenterally depending on the nature of the condition and further modifications were made based on the response to treatment. Out of the twelve cases, improvement was reported in eight cases, death occurred in two cases, and owner did not report for a review in two cases.

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References

Creevy, E.K.2009. Airway evaluation and flexible endoscopic procedures in dogs and cats: laryngoscopy, transtracheal wash, tracheobronchoscopy, and bronchoalveolar lavage. *Vet. Clin. Small. Anim.* **39** : 869–880

Day, M.J., Billen, F., clerx, C. 2006. Diagnosis of pharyngeal disorders in dogs: a retrospective study of 67 cases. *J. Small. Anim. Pract.* **47:** 122-129

Rha, J.U., and Orla Mahony. 1999. Bronchoscopy in Small Animal medicine: indications, instrumentation, and techniques. *Clin. Tech. in Small Anim. Pract.* Vol 14, **14**(4): pp 207-212

Johnson, L.R. and Pollard, R.E. 2010. Tracheal Collapse and Bronchomalacia in Dogs: 58 Cases. *J.Vet .Intern. Med.***24**:298–305

Kaye, B.M., Susanne, A., Boroffka, E.B., Annika, N., Haagsman, and Gert ter haar.2015. Computed tomographic, radiographic, and endoscopic tracheal dimensions in english bulldogs with grade 1 clinical signs of brachycephalic airway syndrome. *Vet. Radiol. Ultrasound.* ***5:*** 609–616.

Kogan, D.A., Johnson, L.R., Jandrey, K.E. and Pollard, R.E. 2008.Clinical, clinicopathologic, and radiographic findings in dogs with aspiration pneumonia: 88 cases. *J. Am. Vet. Med. Assoc.***233**:1742–1747

Kuehn, N.F., and Hess, R.S. 2004. Bronchoscopy. In : King, L.G. Ed., *Textbook of Respiratory Disease in Dogs and Cats.* Elsevier, USA, pp. 112–118

Mercier, E., Bolognin, M., Hoffmann, A.C., Tual, C., Day, M.J., and Clercx, C. 2011. Influence of age on bronchoscopic findings in healthy beagle dogs. *The Vet. J.* **187 :** 225–228

Tenwolde, A.C., Johnson, L.R., Hunt, B., Vernau, W., and Zwingenberger, A.L. 2010. The role of bronchoscopy in foreign body removal in dogs and cats: 37 Cases. *J. Vet.Int. Med*. **24**:1063–1068

White, R.A.S., and Williams, J. M. 1994. Tracheal collapse in the dog - is there really a role for surgery? A survey of 100 cases. *J. Small. Anim. Pract.* **35,** 191-196. ■