

## Congenital Lobar Emphysema Caused by Aplasia of Bronchial Cartilage in a Pekingese Puppy

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Congenital lobar emphysema is an uncommon entity that causes severe dyspnea and cyanosis in human infants and usually is caused by a lack or maldevelopment of cartilage in the walls of the bronchial tree of the affected lobe. Mucomembranous folds, bronchial valves, or aberrant vessels sometimes cause bronchial obstruction and air-trapping. One of the cranial lobes or the right middle lobe may be affected. There is a strong male sex predominance.<sup>3,5,10</sup>

An 11-week-old male Pekingese puppy was presented with a history of slowly progressing dyspnea of five weeks duration. There was no history of trauma or other disease. Abdominal respiration predominated, and the respiration rate was increased. On auscultation of the thorax, lung sounds were increased on the left side and decreased on the right side.

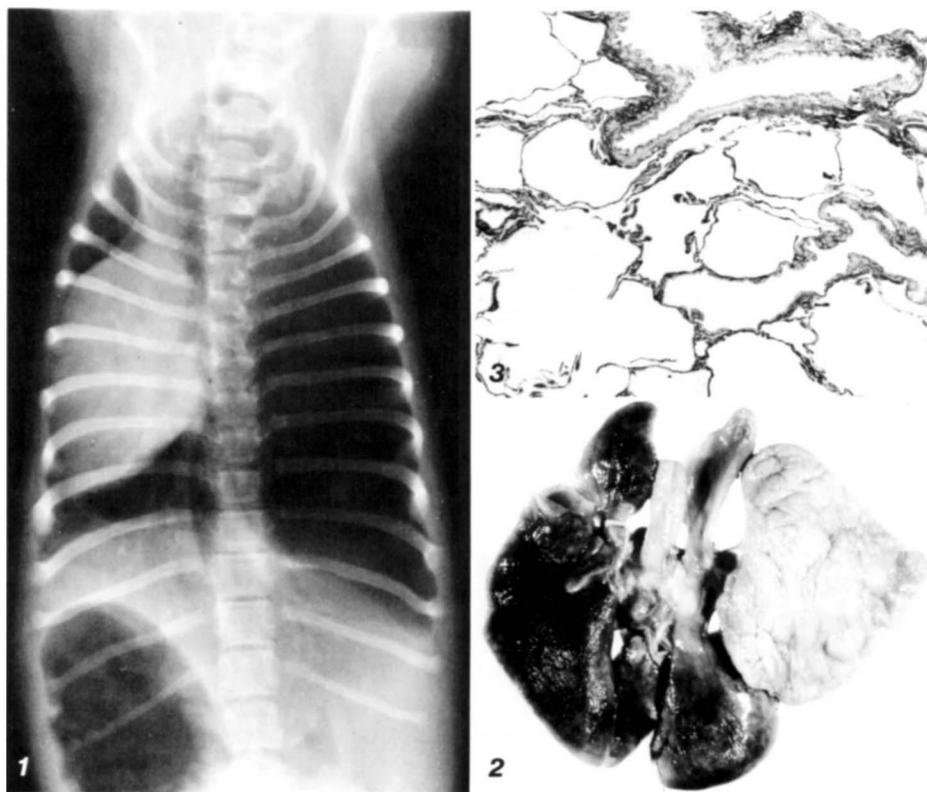
The right hemithorax appeared hyperlucent on thoracic radiographs. Bronchovascular markings were absent. There

was displacement of the heart, mediastinum and right main bronchus to the left, and the right hemidiaphragm was displaced caudally (Fig. 1).

Based on clinical and radiographic findings, a differential diagnosis of unilateral tension pneumothorax and congenital pulmonary cyst was made. The dog was killed at the owner's request.

At necropsy only the lungs were abnormal. The entire right middle lobe was extensively enlarged by emphysema and filled most of the right thoracic cavity. The right cranial lobe was decreased in size, while the other right and left lobes were moderately collapsed (Fig. 2). No gross lesions were found in the trachea or bronchi.

Histologically the right middle lobe revealed diffuse extensive alveolar emphysema and dilated bronchioles and terminal airways. Cartilaginous rings or cartilaginous tissue were absent around the bronchi, while bronchial glands and mus-



**Fig. 1.** Dorsoventral radiograph of thorax. Hyperlucent right hemithorax; absence of bronchovascular markings; displacement of heart, mediastinum and right main bronchus to left and caudal displacement of right hemidiaphragm.

**Fig. 2.** Overinflation of right middle lobe and collapse of other lung lobes.

**Fig. 3.** Right middle lobe. Absence of cartilaginous rings or cartilaginous tissue around a bronchus. Severe alveolar emphysema. Haematoxylin and eosin, 15 $\times$ .

cle fibers were present. Bronchi and bronchioles were lined by a single layer of either columnar or cuboidal epithelial cells. A layer of elastic fibers of various thicknesses surrounded the bronchioles (Fig. 3). All other lung lobes had some degree of atelectasis, normal cartilaginous rings around the bronchi, and a normal amount of elastic fibers around the bronchioles.

Radiographic hyperlucency of a hemithorax, mediastinal shift, and caudal displacement of a hemidiaphragm may indicate unilateral tension pneumothorax, large unilateral pulmonary cyst, or unilateral emphysema. Differentiation between these conditions may be difficult both in man and dogs.<sup>3,5,11</sup> Spontaneous pneumothorax in dogs is rare,<sup>6</sup> and unilateral pneumothorax is possible only when the mediastinum is not injured.<sup>1,7</sup> Congenital pulmonary cysts in dogs have been described as thin-walled, air-filled cavitory lesions of various sizes,<sup>8</sup> occupying an entire caudal lobe,<sup>2</sup> or filling an entire hemithorax.<sup>12</sup>

In our puppy no bronchovascular markings were radiographically visible probably due to severe overinflation of the affected lung structures. Therefore, emphysema was not included in the differential diagnosis.

Congenital emphysema of both cranial lobes was described in a basset hound<sup>8</sup> and of the right middle lobe in a Yorkshire terrier,<sup>13</sup> a Shih Tzu and a Jack Russell terrier,<sup>4</sup> but in none was histologic confirmation concerning the cause of emphysema available. No unequivocal cases of congenital lobar emphysema secondary to aplasia of bronchial cartilage have been documented in animals.

The histologic features of the right middle lobe were similar to those described in the literature for congenital lobar emphysema caused by lack of bronchial cartilage in infants.<sup>9</sup> The lack of bronchial cartilage is considered the primary lesion, and therefore the term bronchial cartilage aplasia could also be used to describe this entity. The lack of cartilage allows expiratory collapse of the large bronchi, followed by progressive overinflation of the entire lobe, which becomes very extensive and leads to compression of adjacent lobes and mediastinal and diaphragmatic displacement. In young dogs, congenital lobar emphysema caused by aplasia of bronchial cartilage should be a differential diagnosis of dyspnea and radiographic evidence for unilateral hyperlucency and

mediastinal and diaphragmatic shift. The only effective treatment would be resection of the affected lobe.

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## Canine Liposarcoma

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The incidence of liposarcoma in dogs,<sup>3,10,13,18,21</sup> in contrast to lipomas,<sup>22</sup> has been reported as low. Documented cases have dealt exclusively with the light microscopic appearance of the tumor<sup>1,2,6,8,12,23</sup> and ultrastructural features have not been described. We have examined six cases of liposarcoma in dogs and have further studied two of the cases by electron microscopy.

The material for this study was obtained from surgical and necropsy submissions (1978-1983) to the University of Georgia Veterinary Teaching Hospital and the University of Nebraska Veterinary Diagnostic Center. A full necropsy examination was performed on dog 3. Biopsies were examined from the others. Tissues were fixed in 10% neutral buffered formalin, sectioned at 5  $\mu$ m, and stained with hematoxylin