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Assessement of Computed Tomographic Lung Density in Beagle and Shihtzu Dogs: Influence of Position and Positive end Expiratory Pressure

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The objective of this study was to measure densities in various areas of the normal canine lung with computed tomography(CT) depending on influences of gravity and the degree of lung inflation and to determine optimal positions and positive end expiratory pressure of canine lung for CT scanning.

In each eight normal Beagle and Shihtzu dogs, a respiratory breathhold maneuver without spontaenous breathing at different positive end expiratory pressure(PEEP) of 0mmHg, 10mmHg and 20mmHg was applied with the position of right and left lateral recumbency, sternal recumbency, and dorsal recumbency and spiral-CT scans of the total lung were acquired. Slices were selected at three levels through the apex, middle and basal lung at the aortic arch, carina and just above the diaphragm and lung density was measured in the dorsal, ventral, and lateral portions of the peripheral lung field.

Lung density in dependent areas was higher than in nondependent areas($p < 0.05$) regardless of species, positions, anatomic locations at the PEEP of 0mmHg and 10mmHg. However, no significant difference of lung density was found at PEEP of 20mmHg in both species except the dorsal recumbency in Shihtzu dogs. This density gradient in the dependent areas is strongly influenced by PEEP($p < 0.05$). In the four positions on the CT gantry, the lung density at the dependent and nondependent location of the lung was greater at the aortic arch than at the base($p < 0.05$). Lung density decreased on identical location according to increase of PEEP($p < 0.05$). There was no significant difference between right and left lung density at sternal and dorsal recumbency and no significant difference of the dorsal, ventral, and lateral portions of lung density at the right and left recumbency under identical pressure.

It is implied that during chest CT scan with 20mmHg of positive end expiratory pressure with right or left lateral recumbency, canine lung density do not influenced by gravity or anatomic location.

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