Quantification of Exerimentally Induced-Pleural Effusion in Beagle Dogs: Radiography versus CT and Ultrasonography

Ki-Ja Lee, I-Se O, Hee-Chun Lee[1], Seong-Mok Jeong,
Ho-Jung Choi, Young-Won Lee*

College of Veterinary Medicine, Chungnam National University
[1]*Research Institute of Life Sciences, Gyeongsang National University*

Introduction: Pleural effusion is an abnormal accumulation of fluid within the pleural space and is a common clinical problem in human and small animal. Quantification of pleural effusion volume is important because effusion size may impact on the decision of whether to perform thoracocentesis, and possibly influencing the approach used for the procedure.

Material and Methods: Normal saline of 10 ml/kg was infused into the pleural space until a final loading volume of 60 ml/kg body weight was reached in six Beagle dogs. The radiographic examination was performed for the detection of presence or absence of pleural effusion and quantification of it. On the ultrasonographic study, the maximum perpendicular distance was measured between the surface of the lung and the thoracic wall to evaluate pleural effusion. On the CT image, pleural effusion was evaluated as the perpendicular distance in the maximum pleural effusion volume on any transverse images with soft tissue window. Statistical analysis was performed using linear regression test.

Results: The volume of pleural effusion and measurements of radiography and ultrasonography had no statistical relationship. However, a significant correlation was identified between the volume of pleural effusion and the depth at right (r^2=0.715), left (r^2=0.745), and mean of right and left depth (r^2=0.844) on the CT images. Especially, the mean of right and left depth was detected with high correlation.

Conclusion: All of the thoracic radiographs, ultrasonography, and CT are useful in recognition of pleural effusion. In quantification of pleural effusion, the CT measurement method is suitable to radiographic and ultrasonographic measurements.

* corresponding author: lywon@cnu.ac.kr