Influence of distribution of emphysema on diaphragmatic motion in COPD patients.

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[Purpose] It is known that the patients with lower predominant emphysema show more severe pulmonary dysfunction [1]. We evaluated the influence of the distribution of the emphysema on the diaphragmatic movement using MRI.

[Subjects & Methods] The subjects were 34 male patients diagnosed with COPD (age, 69.8±6.3 years). MR, CT & pulmonary function tests were performed. Sequential MR images of the right lungs were obtained during deep breathing (0.28msec/image). The movement of the diaphragm was estimated as the area swept by the diaphragmatic line in subsequent images. "Paradoxical movement (Mp)" was defined as downward (or upward) motion when lung area decreases (or increases) and Mp (%) = 100 x paradoxical movement / total movement of the diaphragm [2]. On CT images we measured RA-950, it is the ratio of lung volume under -950HU to whole lung volume [3].

[Results] Average of Mp(%)in deep breathing was 11.9±3.9 (%).It showed significant correlation with FEV1.0 (p=0.04) (Fig.1). RA-950 of the lower lung field , right lung, left lung and whole lung showed significant correlation with Mp(%). Peason's correlation coefficient between RA-950 of lower lung part and Mp(%) during deep breathing was 0.540 (p<0.001)(Fig.2A), greater than 0.401 (p=0.019) between RA-950 of right lung and Mp(%).RA-950 of upper lung fields showed no significant correlation with Mp(%) (Fig.2B).

[Discussion & Conclusion] Paradoxical movement of the diaphragm was correlated with airway obstruction. Our results suggest that emphysema of the lower lung fields would have greater influence on the diaphragmatic motion than the upper lung emphysema.

[References] 1,Invest Radiol 2000;35:235-43, 2, Eur Respir J 2002;19:225-231 3, Radiology 1999;211:851-858

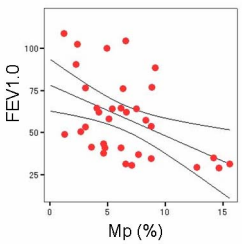

Fig1

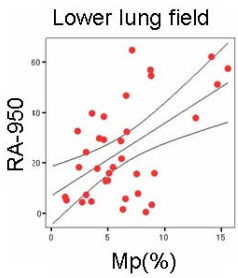

Fig.2A

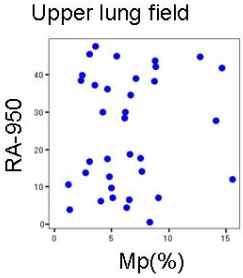

Fig.2B