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Efficacy of Computed Tomography Hounsfield Unit (HU) in Differentiation of Transudate and Exudate in Patients with Pleural Effusion

Fatma Durmaz¹, Mesut Özgökçe¹, Ferhat Cüce², Veysel Atilla Ayyıldız³¹Department of Radiology, Van Yüzüncü Yıl University School of Medicine, Van, Turkey²Department of Radiology, Gülhane Training and Research Hospital, Ankara, Turkey³Department of Radiology, Süleyman Demirel University School of Medicine, Isparta, Turkey

Objectives: We aimed to evaluate the efficacy of computed tomography (CT) imaging in differentiation of pleural exudate and transudate using attenuation values.

Methods: This monocentric retrospective study included 51 patients who were diagnosed with homogeneous pleural effusion and underwent chest CT between July 2015 and May 2017. The mean value in Hounsfield units of an effusion was determined using a region of interest on the three slices in upper, middle and lower zones with the greatest quantity of fluid. On the basis of Light's criteria, effusions were classified as exudates or transudates using laboratory biochemistry markers. We didn't investigate additional CT findings such as fluid loculation, pleural thickening, and pleural nodules.

Results: 15 of the fifty-one pleural effusions were transudates and 36 were exudates. The mean attenuation of the exudates (average: 10.8 HU (6–28 HU)) was not significantly higher than the mean attenuation of the transudates (average: 8.4 HU (0.1–18 HU) (p=0.34)).

Conclusion: PE is a common clinical finding with a wide spectrum of etiologic features. Heart failure, parapneumonic effusion, empyema, pulmonary embolism, inflammatory diseases, and malignancies could be included in its etiology. The differential diagnosis of PE can be conducted by means of thoracentesis, pleural biopsies, and occasionally diagnostic thoracoscopy. Although thoracentesis is considered a relatively safe procedure, it is associated with risks such as pneumothorax and has several contraindications such as coagulopathy. Finding an efficient noninvasive technique to help characterize pleural effusions is challenging and would be beneficial for many patients. As a noninvasive method, we expected to find the BT-HU value of the exudate to be higher than transudate. But there was no statistically significant difference between transudate and exudate BT-HU values.

Conclusion: CT attenuation values did not show any potential clinical value in the characterization of pleural fluid. Because of overlapping HU values, close correlation with clinical findings is essential. Additional signs, such as fluid loculation and pleural thickness, should be considered and may provide further information for the differentiation.

Keywords: Pleura effusion, computed tomography, hounsfield unit (HU)