

**IMPACT OF QUANTITATIVE ASSESSMENT OF COMPUTED  
TOMOGRAPHY VALUE BY USING LUNG PERFUSED BLOOD VOLUME  
COMPUTED TOMOGRAPHY FOR THE DIAGNOSIS OF CHRONIC  
THROMBOEMBOLIC PULMONARY HYPERTENSION**

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**【objectives】**

Lung perfused scintigraphy is a noninvasive and widely used imaging modality for the diagnosis of chronic thromboembolic pulmonary hypertension (CTEPH). Despite its high sensitivity for diagnosing CTEPH patients, it seems to lack specificity. In addition, this modality is not sufficient to evaluate the lung perfusion in the peripheral area compared with central area. Lung perfused blood volume computed tomography (Lung PBV-CT) can be evaluated lung perfusion quantitatively by using the difference of CT

value. The purpose of this study was to investigate whether we could make a quantitative diagnosis by using lung PBV-CT for patients with CTEPH.

### **【Methods】**

Thirty-five patients (9 CTEPH patients, 5 patients with acute pulmonary embolism (APE), 10 patients with pulmonary artery hypertension (PAH) and 11 controls,  $66.0 \pm 15.6$  years old) underwent lung PBV-CT. Diagnosis of CTEPH and APE was established by lung perfused scintigraphy and pulmonary angiography, and these patients were treated with anticoagulants for at least one month. All patients were examined under the same scanning protocols. We investigated the percentage of lung volume in each range of computed tomography (CT) values.

### **【Results】**

The peak range of CT values of all patients was from 40 to 60 Hounsfield unit (HU), it accounted for 50% of total lung volume. The percentage of lung volume with the CT value under 20HU was significantly higher in patients with CTEPH comparing with other patients (CTEPH:  $70.6 \pm 21.2\%$ , APE:  $27.6 \pm 14.2\%$ , PAH:  $27.8 \pm 19.2\%$ , control:  $26.7 \pm 13.1\%$ ,  $p < 0.001$ ). Receiver-operating characteristics curve analysis indicated that the percentage of lung volume with the CT value under 20HU  $> 41.1\%$  was the optimal cut-off values for the quantitative diagnosis of CTEPH, demonstrating 100% sensitivity and 88.5% specificity. In addition, 4 patients out of 9 CTEPH patients underwent

balloon pulmonary angioplasty. The percentage of lung volume with the CT value under 20HU was significantly improved after this procedure ( $65.3\pm 14.5$  to  $34.2\pm 12.4\%$ ,  $p=0.017$ )

### **【Conclusions】**

Lung PBV-CT would be a definitive modality for the quantitative diagnosis of CTEPH with ease and precision.