

**Pulmonary CT number demonstrates congestive lung in patients with simple total anomalous pulmonary venous connection**

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Background: Pulmonary CT number is reported to help in determining the severity of emphysematous lesion. But little is available on lung congestion. In patients with total anomalous pulmonary venous connection (TAPVC) lung congestion occurs because of pulmonary venous obstruction (PVO). We investigated pulmonary CT number to evaluate the lung conditions in patients with TAPVC. Methods: The medical records of 20 patients with simple TAPVC were reviewed. PVO was judged by echocardiography. Between 2005 and 2009 they underwent High-resolution computed tomography (HRCT) by contrast medium both before and after repair. HRCT scanning was performed with 1.0-mm-thick axial sections. Pulmonary CT number was estimated on three horizontal slices (upper, middle, lower). Regional of interest (ROI) was established to avoid large blood vessels and bronchi. CT number was computed in the range of 30 pixels and represented by Hounsfield units (HU). Results: Nine patients had preoperative PVO and seven had postoperative PVO. All pulmonary CT numbers were distributed from -214 to -686 HU. Preoperative pulmonary CT numbers in patients with infracardiac type TAPVC were significantly larger than those in patients with supracardiac type (-328 vs -437 HU). In early postoperative period pulmonary CT numbers in patients with infracardiac type were still higher. Before operation pulmonary CT numbers in patients with PVO tended to be larger than those in patients with non-PVO (-353 vs -429 HU;  $p=0.083$ ). In middle postoperative period CT numbers in patients with PVO tended to be larger (-483 vs -580 HU;  $p=0.095$ ). Three patients underwent surgery of PVO release. Two patients with pulmonary CT numbers decreasing before re-operation achieved success. But a patient with CT number increasing before each re-operation died. Conclusion: In pulmonary congestion lung water volume increases and pulmonary CT number becomes larger. That CT numbers in infracardiac TAPVC with all preoperative PVO were significantly larger might suggest pulmonary CT number reflected pulmonary congestion by PVO. That patients with CT number improving before re-operation had good progression showed pulmonary CT number served as evaluating intra-individual change of lung conditions. Pulmonary CT number may reflect congestive lung comprehensively in patients with total anomalous pulmonary venous connection.