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A New Perspective for Pulmonary Thromboembolism Radiology: "Pulmonary Vein Sign"

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Objectives: Pulmonary thromboembolism (PTE) is a clinical condition that can result in sudden death. Some indirect findings on chest X-ray may be indicative of PTE. However, computed tomography pulmonary angiography (CTPA) is the most sensitive imaging technique for the diagnosis of PTE. Filling defects in the pulmonary veins, which can be identified in areas adjacent to PTE because venous drainage is decreased by pulmonary arterial obstruction, have been named the "pulmonary vein sign" (PVS). The aim of our study is to determine the frequency, sensitivity, and specificity of PVS due to decreased venous drainage in the affected area in PTE patients.

Methods: Patients who were admitted to the emergency department and outpatient clinics at our hospital due to the suspicion of PTE and who underwent CTPA were evaluated retrospectively. The study group consisted of the patients who had an arterial filling defect on CTPA and were diagnosed with PTE. The control group consisted of the patients who had no arterial filling defect on CTPA.

Results: This study included 286 patients with a mean age of 62 (20-94) years. The PVS was detected in 51 (32.7%) of the patients in the study group and in 15 (11.5%) of the patients in the control group. The PVS had a sensitivity of 32.69%, a specificity of 88.46%, a positive predictive value of 77.27%, and a negative predictive value of 52.27% for PTE. The PVS was significantly more common in the patients having PTE in the bilateral pulmonary arteries or the main pulmonary arteries.

Conclusion: Despite low sensitivity, the presence of PVS on CTPA is a radiographic marker with high specificity for PTE. In order to be used in everyday practice, there is a need for studies with large numbers of patients.

Keywords: Pulmonary thromboembolism, radiographic marker, pulmonary vein sign, specificity