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Evaluation of Pulmonary Metastases in Children by Non-Contrast Chest Computed Tomography

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Abstract

Background: Most of the metastatic lung lesions are relatively high contrast in comparison to the lung background and easily detected in non-contrast enhancement chest computed tomography alone (NECCT). Pediatric patients may get benefit from its minimal radiation dose and lack of adverse reaction from iodinated contrast agent.

Objective: To compare effectiveness of non-contrast enhancement chest computed tomography (NECCT) in detecting thoracic metastasis with full protocol chest computed tomography (FPCCT) (chest computed tomography with and without contrast) in non-hematologic extrathoracic malignancy in children.

Material and Method: Both NECCT and FPCCT were evaluated in 50 pediatric patients with non-hematologic extrathoracic malignancy retrospectively. Lung nodules, ground glass opacities, interlobular septal thickening, pleural effusion, pleural thickening, pericardial effusion, endobronchial lesion, and intravascular metastasis were evaluated separately on each CT protocol by two radiologists.

Results: Thirty boys and 20 girls were included in the present study (mean age = 10 years and 3 months). The lesions include nodule (333 detected by NECCT (median = 3), 336 detected by CECCT (median = 3)), ground glass opacity (12 detected by NECCT (median = 0), 15 detected by CECCT (median = 0)), interlobular septal thickening (12 detected by NECCT (median = 0), 11 detected by CECCT (median = 0)). There was 100 percent match of calcified nodules (n = 36), pleural effusion (n = 1), pleural thickening (n = 3), intravascular thrombus (n = 2), and mediastinal lymph node (n = 1) between NECCT and FPCCT studies. There was no statistically significant different in capability of demonstrating all lesions between NECCT and FPCCT. Most of the discrepancies between NECCT and FPCCT were from motion artifact, inadequate inspiration, and radiologist's opinion rather than effect of contrast agent administration itself.

Conclusion: NECCT is as effective as FPCCT in evaluation of pulmonary metastasis in non-hematologic extrathoracic malignancies. For evaluation of lung metastases in this population, NECCT alone is sufficient.

Keywords: Computed tomography, Non-contrast chest computed tomography, Lung metastasis, Radiation reduction, Radiation dose reduction

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