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学位論文の題名	<p>Dual-energy CT can evaluate both hilar and mediastinal lymph nodes and lesion vascularity with a single scan at 60 seconds after contrast medium injection</p> <p>(Dual energy CT を用いた造影後 60 秒 1 回撮影法による肺門縦隔リンパ節及び病変血流の同時評価の試み)</p> <p>Acad Radiol. 2012; 19: 1003-10</p>
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Dual-energy CT Can Evaluate Both Hilar and Mediastinal Lymph Nodes and Lesion Vascularity with a Single Scan at 60 Seconds after Contrast Medium Injection

Abstract

Purpose. Contrast-enhanced computed tomography (CE-CT) is the standard imaging modality for this purpose. It has been reported that scanning soon after contrast material injection (e.g., 30 s) is appropriate for clearly depicting the hilar and mediastinal lymph nodes (LN) (1-5). Therefore, post-contrast scans have been performed twice: at an early and late phase to evaluate vascularity of lesions. It is, however, desirable if both demands could be fulfilled by a single scan. With a dual-energy (DE) CT, different contrast images at low and high tube voltages can be obtained at one time and no significant difference has been reported in image noise and radiation dose between single-energy acquisition and weighted-average 120-kVp DE images generated from a combination of the 80-kVp and 140-kVp images (6). We investigated whether the 80-kVp and weighted-average 120-kVp CT images scanned at 60 s after contrast material (CM) injection using a dual-source CT could substitute for the conventional 120-kVp images obtained at 30 and 100 s.

Materials and methods. Eighty-three consecutive patients with suspected lung cancer were enrolled. Images were obtained with DE mode (80 and 140 kVp) at 60 s and a conventional 120-kVp mode at 30 and 100 s after CM injection. CT numbers of the pulmonary artery (PA), pulmonary vein (PV), hilar zone LN, and pulmonary lesions were measured. Contrasts between the PA/PV and LN and beam-hardening artifacts were visually evaluated using 5- and 4-point scales, respectively. The degree of enhancement was evaluated on 30-s 120-kVp, 100-s 120-kVp, and 60-s weighted-average 120-kVp images.

Results. The mean differences in attenuation (HU) between the PA/PV and LN on the 30-s 120-kVp, 60-s 80-kVp, and 60-s weighted-average 120-kVp images were 184/155, 130/140, and 84/92, respectively (all $p < 0.001$). The mean contrast scores for the hilar/mediastinal LN were 4.5/4.7, 3.7/4.2, 3.3/3.6, and 2.4/2.5 for these three and for 100-s 120-kVp images, respectively (all $p < 0.01$). The mean artifact scores of the four

images were 1.2, 3.4, 3.6, and 4.0, respectively. On 60-s weighted-average 120-kVp images, 55 of 60 lesions (92%) showed a higher enhancement than on 100-s conventional 120-kVp images.

Conclusion. DECT images scanned at 60 s after CM injection show excellent vessel-LN contrast and enhancement of lesions and can replace the dual-phase scan protocols.

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