学 位 論 文 の 要 旨

三 重 大 学

所 属	三重大学大学院医学系研究科 甲 生命医科学専攻 臨床医学系講座 放射線医学分野	氏 名	蟹井（かにい） 善統（よしのり）

主論文の題名

Usefulness of dictionary learning-based processing for improving image quality of sub-millisievert low-dose chest CT: initial experience

主論文の要旨

Purpose:

To develop a dictionary learning (DL)-based processing technique for improving image quality of sub-millisievert chest computed tomography (CT).

Materials and methods:

Standard-dose and sub-millisievert chest CT were acquired in 12 patients. Dictionaries including standard- and low-dose image patches were generated from the CT datasets. For each patient, DL-based processing was performed for low-dose CT using the dictionaries generated from the remaining 11 patients. This procedure was repeated for all 12 patients. Image quality of normal thoracic structures on the processed sub-millisievert CT images was assessed with a 5-point scale (5=excellent, 1=very poor). Lung lesion conspicuity was also assessed on a 5-point scale.

Results:

Image noise on sub-millisievert CT was significantly decreased with DL-based image processing (48.5±13.7 HU vs 20.4±7.9 HU, p=0.0005). Image quality of lung structures was significantly improved with DL-based method (middle level of lung, 2.25 ± 0.75 vs 2.92 ± 0.79, p=0.0078). Lung lesion conspicuity was also significantly improved with DL-based technique (solid nodules, 3.4±0.6 vs 2.7±0.6, p=0.0273).

Conclusion:

Image quality and lesion conspicuity on sub-millisievert chest CT images may be improved by DL-based post-processing.