

H-019

Multi-Slice Helical CT for Lung Cancer Screening: Diagnostic Performance Evaluation of 10mm and 2mm Thickness CT Slice Images

Marodina Sinsuat (1) Mitsuru Kubo (1) Yoshiki Kawata (1) Noboru Niki (1) Hironobu Ohmatsu (2) Michizou Sasagawa (3) Noriyuki Moriyama(4)

1. Background

One recent development of multi-slice CT for lung cancer screening is, it has 10 times higher resolution than conventional helical CT. Furthermore, thin slices give better z-axis resolution. It is therefore possible to detect small nodules through these images. This study comparatively evaluates lung cancer test by physicians using 2mm and 10mm thickness CT images and its effect on physicians' diagnostic performance.

2. Methods

The study sample consisted of 360 cases. Six (6) physicians participated in the reading test. Both 2mm and 10mm thickness CT images were obtained from the same subject. Reading test was performed using specific criteria from B to E, where judgment B is no abnormality finding and E is definite malignant nodule finding. Each letter judgment was further categorized (Fig. 1). These criteria were specified so that no physician could read both CT images of the same subject. The reading test was done by, first individual reading by the physician of multi-slice 2mm and 10mm thickness CT images. Then, physicians presented their readings as a group. Three physicians decided the final evaluation.

The device used was Toshiba Aquilion, slice thickness (2mm and 10mm), tube current 30[mA], tube voltage 120[kV], reconstruction interval 1[mm], 10[mm], helical pitch 5.5, pixel size 0.625 [mm] and image size 512 x 512 pixel

3. Results

Table 1 summarizes the judgment of physicians on the subject using 2mm and 10mm CT slice thickness.

The total number of nodules on 2mm and 10mm slice thickness are 2448 and 1676 respectively. Figure 2 shows comparison of judgment and nodule images. There was no significant difference between the number of nodules in judgment E of 10 mm slice thickness and that of 2 mm slice thickness. Moreover, some nodules were missed in the 10mm thickness slice image.

4. Discussion

We comparatively evaluated lung cancer reading test by physicians using 2mm and 10mm thickness CT images. The purpose was to determine the effect of slice thickness on physician's diagnostic performance. There were more nodules found on 2mm thickness than on 10mm thickness. Moreover, quantitative evaluation proved that by using 2mm thickness, the diagnostic performance of physicians improved. Average size of the nodule diameter on 2mm thickness slice was smaller than on 10mm. These results indicate that thin slice scanning for lung cancer screening contributes to the improvement of the physician's diagnostic performance.

- (1) Dept .of Optical Science, University of Tokushima
- (2) National Cancer Hospital East
- (3) Tohigi Public Health Service Association
- (4) National Cancer Research Center for Cancer Prevention and Screening

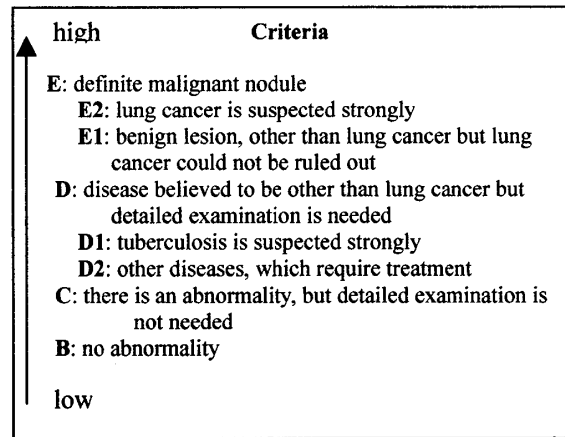


Fig. 1 Reading Test Judgment Criteria

Judgment	E2	E1	D1	D2	C	B	Total
2mm	5	92	33	23	168	39	360
10mm	1	91	11	12	182	63	360

Table 1 Result of Reading Test Judgment on Subjects

Judgment	E2	E1	D1	D2	C	B	Total
2mm	5	122	104	85	2132	-	2448
10mm	1	133	59	22	1461	-	1676

Table 2 Result of Reading Test Judgment on Nodules

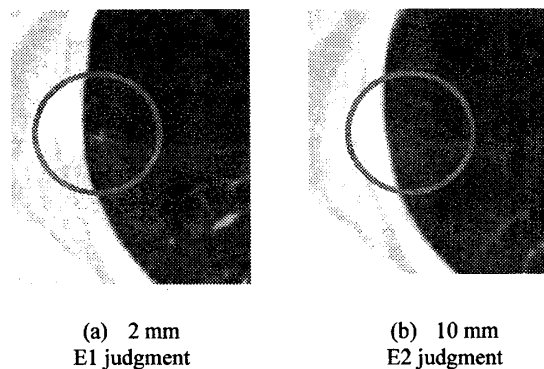


Fig. 2 Comparison of Nodule images

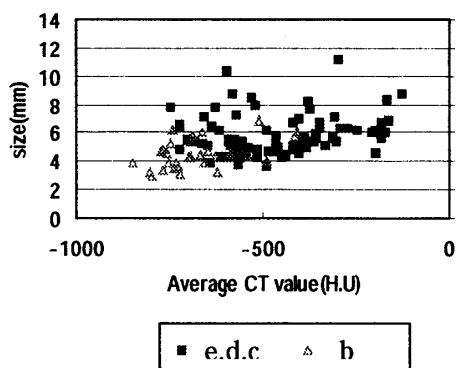


Fig.3 Scatter plot of 2mm thickness size and CT average value.

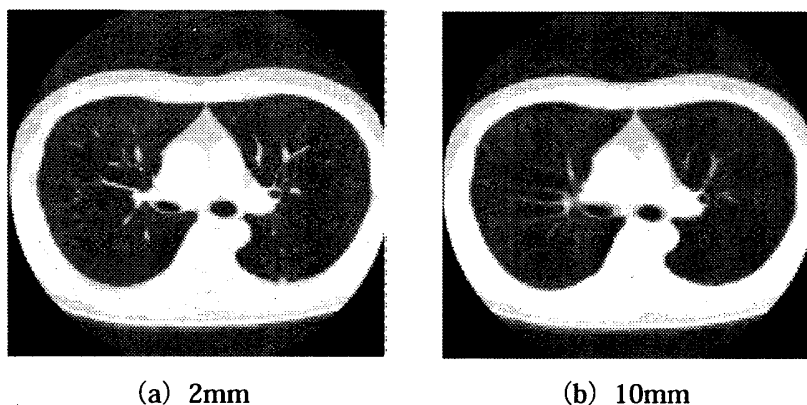


Fig. 4 Axial Image

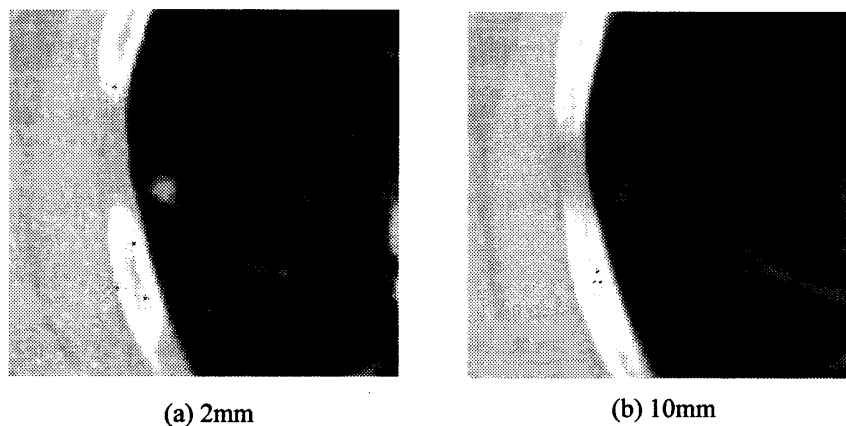


Fig. 5 Nodule Images

**6. References**

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