<Symposia> Lung cancer : recent advances
Early screening of lung cancer

Kiyoshi Murata, MD
Department of Radiology
Shiga University of Medical Science, JAPAN

Lung cancer is the leading cause of cancer-related death among western countries and Japan, and it is no doubt that early detection of lung cancer followed by appropriate treatment is important as the strategy for decreasing mortality rate of this disease. The techniques employed for mass screening of lung cancer include chest radiograph, computed tomography (CT), and sputum cytology. Although various new techniques for sputum cytology have been reported, they are beyond the scope of this lecture so that only radiological methods will be discussed.

Although lung cancer screening with chest radiograph and sputum cytology is not recommended in the United States based on the results of the randomized controlled studies performed in the 1970s, recent case-control studies published in early 2000s have shown the significant decrease of mortality rate in the screening group. Therefore, with good quality-control of the screening system, lung cancer screening with chest radiograph may be re-evaluated as the screening method in the future. In addition, because chest radiograph obtained by the digital system is easy in image-processing, computer-aided diagnosis (CAD) software such as temporal subtraction image has a potential to help radiologists detect lung cancers.

Because it was reported that small and/or ground-glass lung cancers were frequently missed on chest radiographs and that they were considered to be the early stage of well-differentiated adenocarcinomas, CT screening for lung cancer was proposed in 1990s along with the development of helical CT which enabled us to scan the whole lung in a single breath-hold. Low-dose helical CT showed that several times more lung cancers could be detected and most of them were stage I lung cancers. Furthermore, recent introduction of multi-detector row CT (MDCT) has made it possible to obtain thin-section (high-resolution) CT images of the whole lung in a single breath-hold, resulting in improvement in detecting small and faint nodules. Thus, it is considered that we have now sufficiently-sensitive method for detecting lung nodules. However, MDCT also provided difficult problems including too much data to be evaluated by radiologists and high false positive rate. In addition, radiation exposure of the subjects examined is another important problem and much efforts are necessary to

decrease it especially in the screening setting.

To overcome these problems, various CAD techniques for nodule detection and volume measurement have been recently reported. Although these techniques need further refinement, they would become useful methods for lung cancer screening in the future.

In this lecture, the present status and the future direction of lung cancer screening will be discussed.