عنوان مقاله:

Image Quality and Pulmonary Nodule Detectability at Low-dose Computed Tomography (low kVp and mAs): A phantom study

محل انتشار:

تعداد صفحات اصل مقاله: 5

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خلاصه مقاله:

Background: Nowadays, there has been a growing demand for low-dose computed tomography (LDCT) protocols. CT has a critical role in the management of the diagnosis chain of pulmonary disease, especially in lung cancer screening. There have been introduced several dose reduction methods, however, most of them are time-consuming, intricate, and vendor-based strategies that are hardly used in clinics routinely. This study aims to evaluate the image quality and pulmonary nodule detectability of LDCT protocols that are feasible and easy implemented. Image quality was analyzed in a general quality control phantom (Gammex) and then in a manmade lung phantom with nodules-equivalent objects. Methods: This study was designed in a two steps, in the first step, a feasible low-dose lung CT protocol was selected with quality assessment of accreditation phantom image. In the second step, the selected low-dose protocol with an appropriate image quality was performed on a manmade lung phantom in which there were objects equivalent to the pulmonary nodule. Finally, image quality parameters of the phantom at the appropriate scan protocol were compared with the standard protocol. Results: A reduction of about ۱۷% of kVp and ۴۶% in tube current leads to dose reduction by about ۷۰%. The contrast-to-noise ratio in the low-dose protocol remained almost unchanged. The signal-to-noise ratio in the low-dose protocol decreased by approximately ۳۲%, and the noise level has increased by about ۱.۵ times. However, this reduction method hardly affected the detectability of nodules in man-made pulmonary phantom. Conclusions: Here, we demonstrated that the LDCT scan has an insignificant effect on the perception of lung nodules. In this study, patient dose in lung CT was reduced by modifying of kVp and mAs about approximately ۷۰%. Hence, to step in toward low-dose strategies in medical imaging clinics, using easy-implemented and feasible low-dose strategies may be helpful.

کلمات کلیدی:

Computed tomography, image quality, low-dose radiation, lung cancer screening

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