双源CT能谱纯化对肺及乳腺联合筛查的低剂量研究

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Title: The low dose study of dual-source CT spectral purification for lung and breast screening

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摘要: 目的：探讨第3代双源CT能谱纯化Sn100 kV超低剂量扫描与64排螺旋CT低剂量扫描对比在乳腺及肺联合筛查中对图像质量和辐射剂量的影响。方法:回顾性分析40例行第3代双源CT Sn100 kV胸部超低剂量扫描的女性体检者为实验组,另选取40例采用64排螺旋CT扫描机行低剂量胸部CT筛查的女性体检者为对照组，比较两种扫描方案乳腺和肺的图像质量和辐射剂量。结果:在乳腺及肺客观图像质量对比中，实验组气管、腋下脂肪、肩胛下肌噪声值较对照组均有所下降(P < 0.05)，差异有统计学意义；同时,实验组信噪比(SNR)较对照组均有所提升，差异有统计学意义(P < 0.05)。实验组乳腺腺体噪声亦较对照组下降(P=0.00)。实验组的肺及乳腺图像质量主观评分均优于对照组,评分差异有统计学意义(P < 0.05)，两名评价者之间一致性强Kappa=0.82。实验组的剂量长度乘积（DLP）及有效辐射剂量（ED）较对照组明显下降(约达86%)。结论:第3代双源CT Sn100 kV超低剂量扫描方案较64排螺旋CT低剂量扫描可在提高乳腺及肺图像质量的同时显著降低辐射剂量，为临床通过胸CT扫描对女性体检者进行肺癌及乳腺癌联合筛查提供了新的参考,达到“一查双筛”的目的。

Abstract: Objective:To evaluate the image quality and radiation dose for combined lung and breast screening using ultralow dose CT protocol at 100 kV with tin filter (Sn100 kV) of the 3rd generation dual-source scanner in comparison to low-dose protocol of 64 rows CT.Methods:40 females undergoing ultralow dose protocol Sn100 kV were retrospectively enrolled into experiment group,whereas other 40 females who performed low dose chest CT protocol at 130 kV were selected into control group.Objective image quality expressed by image noise and signal-to-noise ratio (SNR) and subjective image quality based on a 5-scale score were assessed.Radiation dose was recorded and compared between two groups.Results:For the images of breast and lung,the noise of trachea,axillary fat and subscapularis were decreased in the experiment group compared with the control group.There were significant differences(P < 0.05).The SNR of the experiment group was higher than that of the control group,and the difference was statistically significant（P < 0.05）.The breast gland noise was also decreased compared to the control group (P=0.00).Subjective image quality also showed significant differences both of lung and breast between two groups.Effective dose of ultralow dose group was reduced 86% compared to the control group.Conclusion:The third-generation dual-source CT Sn100 kV low-dose scan is better than the 64 rows spiral CT low-dose scan,which can improve the quality of breast and lung images while significantly reducing the radiation dose,providing a new reference for clinical female examinees who carry out combined screening for lung and breast cancer through chest CT scan.

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