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衰减校正、空间位置及旋转半径对SPECT分辨力的影响

Impact of attenuation correction, position and radius of rotation on spatial resolution of SPECT

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中文关键词: [体层摄影术](#), [发射型计算机单光子](#), [分辨力](#), [衰减校正](#), [旋转半径](#)

英文关键词: [Tomography](#), [emission-computed](#), [single-photon](#), [Resolution](#), [Attenuation correction](#), [Rotational radius](#)

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中文摘要:

目的 探讨SPECT断层成像图像空间分辨力及衰减校正、空间位置和旋转半径对SPECT分辨力的影响。方法 采用Siemens Symbia T成像设备,选择平行孔低能高分辨准直器,在3种不同旋转半径下分别对椭圆柱分辨力模型行SPECT及CT成像。椭圆柱空间分辨力模型中,在长轴方向分布着5条与椭圆柱体轴平行的线源。以有序子集最大期望值法重建图像,对3种旋转半径下的图像分别进行有无CT衰减校正重建。以半高宽(FWHM)表示所有重建图像的分辨力,分别对沿长半轴分布的5条线源计算6个层面上的FWHM。结果 线源距视野中心越远,径向、切向的分辨力越好,切向差异更明显;分辨力随旋转半径增大而降低;衰减校正后FWHM略有降低。结论 视野中的空间位置、旋转半径均对SPECT成像系统空间分辨力有所影响,CT衰减校正对空间分辨力的提高作用有限。

英文摘要:

Objective To investigate the impact of CT attenuation correction, position in the field of view and the rotational radius on SPECT spatial resolution. **Methods** SPECT and CT imaging of an elliptical cylinder resolution phantom was performed using Siemens Symbia T equipment in 3 different rotational radius with parallel hole low-energy high-resolution collimator. In the long axis direction of the resolution model, there were 5 line sources parallel to long axis. The integrated-CT imaging was performed for attenuation correction. Acquisition conditions included 3 rotating orbit of detector with parallel hole collimator and shoot mode. All 3 acquisitions were reconstructed using OSEM algorithm with or without CT attenuation correction. The resolution of line resource spread function was evaluated with the full width at half maximum (FWHM) value. All the reconstructed images were analyzed. Then the FWHM value of 5 line sources in 6 different transverse sections were calculated. **Results** The spatial resolution (radial and tangential) was the worst at center of the visual field, and the closer to the edge, the better the value, so did the resolution of radial direction, while the differences of tangential were greater. When the distance between detector and the phantom increased, the FWHM value increased, indicating that the resolution became poor. The results showed that CT attenuation correction could be improved by FWHM slightly, esp. in central region. **Conclusion** The position in the field of view and the radius of rotation have impact on the image spatial resolution. The impact of CT attenuation correction on spatial resolution of reconstructed images is limited.

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