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正电子发射断层扫描图像部分容积效应的模拟研究及实验检验

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摘要 用模拟实验研究了正电子发射断层扫描(PET)部分容积效应与相关影响因素间的关系。依据形成部分容积效应的理论,由计算机模拟PET各种分辨率情况下各种大小热灶的图像。计算图像的最大恢复系数、平均恢复系数及图像热灶半高宽,并用PET实验进行了检验。结果表明:PET实验的结果与模拟结果一致;当热灶直径以PET分辨率为单位时,图像热灶的最大及平均恢复系数随热灶直径的变化与分辨率无关,且热灶半高宽/分辨率与热灶直径的关系不受分辨率影响。

关键词 [模拟实验](#) [正电子发射断层扫描](#) [部分容积效应](#)

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Simulation Study and Experiment Verify of Partial Volume Effect for Positron Emission Tomography

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Abstract Partial volume effect(PVE) and their influence factors for positron emission tomography(PET) were investigated with computer simulation and experiments. According to the theory of PVE formation, PET images of the hot lesions with different sizes under various system resolutions were simulated with computer program. The maximum recovery coefficient(RC), the average RC in the region of interest of which the size was the same as the real size of the hot lesion, and the full width at half maximum of the hot lesion on the images were calculated and compared with real experiments results. The results of simulation experiments quite agree with the real experiments. The variation curves of the maximum RC, average RC, and the ratio of the full width at half maximum of the hot lesion to the system resolution versus the diameters of the hot lesion, if the real lesion size is scaled in the system resolution, is independent of the system resolution.

Key words [simulation experiment](#) [positron emission tomography](#) [partial volume effect](#)

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