عنوان مقاله:

Determination of Optimum Planar Imaging Parameters for Small Structures with Diameters Less Than the Resolution of the Gamma Camera

محل انتشار:

مجله فیزیک پزشکی ایران, دوره 14, شماره 4 (سال: 1396)

تعداد صفحات اصل مقاله: 10

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خلاصه مقاله:

Introduction: The limited spatial resolution of the gamma camera hinders the absolute quantification of planar images of small structures. The imaged structures are affected by partial volume effects (PVEs), which can spread activity and lead to underestimation of the regional distribution. The use of optimum planar parameters reduces the impact of the limited spatial resolution of the gamma camera and the statistical noise inherent to low photon count, thus improving quantification. In this study, we aimed to determine the optimum planar imaging parameters for small structures. Materials and Methods: A thyroid protocol was used to acquire planar images of the spheres A, B, and C (16 mm, 12 mm, and 11 mm in diameter, respectively) whilst filled with a targeted activity concentration of technetium-99m. One sphere was mounted at the centre of the Jaszczak Phantom and the other two adjacent to its walls using capillary stems fitted on the spheres. The phantom was filled with distilled water. The targeted activity concentrations used were 74 kBq/mL, 100 kBq/mL, 150 kBq/mL, and 300 kBq/mL. Images of the same count per pixel were acquired on 64 64, 128 128, 256 256, 512 512, and 1024 1024 pixels using a vertical detector mounted 5 cm above the phantom. All the images were quantified using ImageJ software, version 1.48a, Java 1.70_51 [64-bit]. Results: The optimum planar imaging parameters established were a matrix size of 128 128 pixels and technetium-99m solution of activity concentration of 300 kBq/ml. Conclusion: The use of optimal imaging parameters reduces the impact of PVEs, leading to improved quantitative accuracy.

کلمات کلیدی:

Medical Imaging, Radioisotope Imaging, Partial Volume Effects