

Cone-beam Reconstruction (CBR) using X-ray Simulator in Intracavitary Brachytherapy

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There are few limitations in conventional CT for localizing the dummy sources due to the slice image which has a certain distance between images. The use of the cone-beam CT in brachytherapy also has limitations because of the economical efficiency in brachytherapy fields. To overcome former problems, we performed the CBR using x-ray simulator. The home-made anthropomorphic pelvic phantom with the localizer and the HDR applicator set was simulated on the digital x-ray simulator. The images were obtained with 10 degree intervals, and the CBR performed in the limited projections (36, 18, 12, 9 projection). The coronal planes (anterior-posterior views) of CBR were mainly used for evaluating a CBR results. We could obtain the CBR images with dummy source and artificial anatomic structure in the phantom. The peak pixel intensity and size differences of the dummy sources, which were important factor to distinguish the dummy sources from the backgrounds in coronal planes, were compared with each CBR results of the limited projections. We present the method for accurate source localization in a substitution for cone-beam CT. This CBR approach provides the exact position of the sources and the delineation of approximate organ structure in brachytherapy planning, thus it could be a useful and economical technique for improving the planning results.

Keywords : Cone-beam Reconstruction (CBR), Intracavitary Brachytherapy