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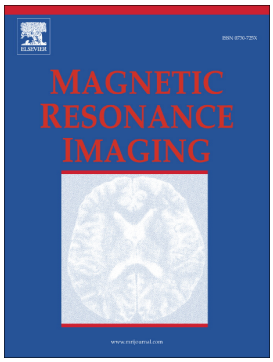

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Early Diagnosis of Radio-insensitive Human Nasopharyngeal Carcinoma Xenograft Models by Diffusion Kurtosis Imaging

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Abstract:

Objective: To investigate the feasibility of DKI in early detection of radio-insensitive nasopharyngeal carcinoma (NPC) xenografts in nude mice. **MATERIALS AND METHODS:** Seventy-two nude mice were implanted with CNE-1 (low radio-sensitive) and CNE-2 (high radio-sensitive) NPC cell lines, and their respective xenografts were obtained. Then, the NPC-bearing nude mice were exposed to different doses of fraction irradiation, which are divided into non-irradiated group (G0), 10Gy group (G1), 20Gy group (G2), 30Gy group (G3), 3rd (G4) and 5th (G5) days after the entire dose (30y) of irradiation. Subsequently, DKI was performed on each group. Tumor volumes, shrink rates, D and K parameters were measured by two experienced radiologists. Student's t-test and receiver operating characteristic (ROC) curve analysis were conducted in this study. **RESULTS:** The differences of volume shrinkage rate between CNE-1 and -2 were observed in G2 (P = 0.032), with the shrink rates of 5.954% and 27.716%, respectively. The D values were reduced at G1 (D_{G1}, P = 0.001) and then increased gradually after irradiation. The K values were increased at G1 (K_{G1}, P = 0.001) and then declined sharply in CNE-2 (P < 0.01), but not in CNE-1 xenografts (P > 0.05). The respective AUC values for D_{G1} and K_{G1} were 0.875 and 0.917, with 66.7% and 83.3% sensitivity and 100% specificity, at the cutoff values of 1.27×10^{-3}mm^2/sec for parameter D and 0.88 for parameter K. **Conclusion:** DKI can be used for