

Dosimetry of ^{166}Ho Chitosan Complex in Cystic Brain Tumor Therapy

아주대학교 핵의학과학교실, 치료방사선과학교실 ¹⁾,
신경외과학교실 ²⁾, 원자력연구소 ³⁾

조철우*, 박찬희, 윤석남, 배문선, 김수지, 강해진 ¹⁾,
조경기 ²⁾, 안영환 ²⁾, 박경배 ³⁾

^{166}Ho emits a high-energy beta particle with a maximum energy of 1.85MeV and a small proportion of gamma rays(80.6keV at 6.6%). It has a physical half-life of a 26.80hr. Therefore ^{166}Ho complex is well suited for radionuclide therapy of benign and malignant disease processes. Cystic lesions or organs would be ideal for ^{166}Ho therapy.

The objective of our study was to evaluate therapeutic feasibility and estimate the absorbed dose distribution to the cystic wall brain tumor.

Seven patients with the cystic brain tumor were treated with ^{166}Ho chitosan complex using 18.5 to 862MBq according to the tumor volume. Two patients of 7 patients were received second and third therapies respectively. The radiation absorbed dose delivered to the tumor was calculated from the medical internal radiation absorbed dose(MIRD) formalism. Dose to the cystic wall was estimated to be half of the central dose. In order to obtain the penetrating absorbed fraction, the count rates of urinary excretion and blood retention measured with a gamma counter and serial imaging study. In order to verify the radiation absorbed dose, TLDs were used in tissue equivalent water phantom and balloon simulating a cystic lesion. For an example, a patient with a 5cc cystic lesion with 14.43MBq in 5cc saline would received an radiation absorbed dose of 100Gy at cystic wall.