

In Vivo Dosimetry of Bladder and Rectum Using Custom-Made Water Phantom during HDR Brachytherapy for Uterine Cervical Carcinomas

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Purpose: To examine the incidence of radiation-induced late risk organ complication by analyzing the data of measured rectum and bladder doses in patients with uterine cervical carcinomas with high dose rate brachytherapy. This study compares the bladder and rectal dose calculated in the computed treatment planning system to that real dose measured with water phantom attached in vivo dosimeter. **Materials and Methods:** Five patients, with a uterine cervical carcinoma, treated with Ir-192 high dose rate brachytherapy(HDR). Six to eight fractions of HDR were delivered two times per week, with a total dose of 28 ~ 32 Gy to point A. When doing a simulation, it got an image from the condition which inserts the diode detector(Type 9112, 9113, PTW) where in vivo dosimetry is possible in the bladder and rectum of patient. It used this images and corresponds to the location of the diode detector from treatment planning system(Plato BPS, Nucletron) the dose of the bladder and rectum which it calculated. Doses in bladder and rectum were measured when doing an actual patient treatment and compared to the computed doses and differences were calculated. In order relative measurement the absorbed doses of the bladder and rectum also it produced the water phantom of 34×30×30 cm³ size where the diode detector affix is possible. The location of the diode detector with location when of the simulation in order to be same, affixed inside the phantom. **Results:** The location of the diode detector which is inserted in the same patient changed every at the time of every treatment a lot, also the deviation of dose appeared result a lot. Also, there were significant differences between the calculated and measured bladder and rectum doses based on the in vivo dosimetry system. The calculated dose and actual measured dose from the whole measurement point appeared with average 6.3±11.85 %. It is like that but, the bladder and rectum doses which it measures from the phantom agreed with a calculated dose well from inside permitted limit. **Conclusion:** From the high dose rate brachytherapy the dose of the bladder and the rectum every when treating it changes and, to use in vivo dosimetry system direct measurement it is necessary. Also, it uses the phantom which is produced and it will be able to verify the calculated dose which it gets from treatment planning system feed with the fact that becomes the fundamental data in dose revision of critical organ with it becomes.

Keywords : Cervical Cancer, High Dose Rate Brachytherapy, In Vivo Dosimetry