

## Comparison of rectal dose in different techniques of prostate cancer external-beam radiotherapy based on TLD and XR type T GAFCHROMIC® film dosimetry

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### Abstract

Background: Radiotherapy of prostate carcinoma often results in high doses to surrounding structures, such as the rectum and bladder. Therefore, these organs should be closely monitored. The aim of this study is to evaluate the dose received by the target volume and rectum to compare two different methods of dose measurement with each other and to check the homogeneity of dose in the tumor volume. Methods: The dose distribution throughout a planned target volume and the rectum (OaR) in a phantom exposed to 6 MV photon beam, similar to treatment conditions were studied. Several techniques of external beam radiation therapy such as two-, three- and four-field have been planned. Dosimetry was performed using GAF-CHROMIC® film and TLD-100 chips. Results: The rectal and cancer volume measured doses in treatment were similar to the prescribed doses. The results of two dosimetry types were compared with each other as well as with treatment planning. Rectal dose in three- and four-field (equal tumor dose and equal applied dose) techniques were respectively 23,10, 28,87 and 10,22% lower than the tumor dose. Conclusion: There was not a statistically significant difference between received and prescribed doses. So, this study showed that the Gafchromic film dosimetry can be used for fast dosimetric evaluations. © Iranian Red Crescent Medical Journal.

### Author keywords

Prostate cancer; Radiation therapy; Rectal dose; TLD; XR type T film

### Indexed Keywords

**EMTREE medical terms:** article; controlled study; dosimetry; external beam radiotherapy; human; intermethod comparison; prostate cancer; radiation dose; radiation dose distribution; radiation exposure; thermoluminescence dosimetry; treatment planning; tumor volume

**Device tradename:** GAFCHROMIC, Wayne, United States, TLD-100, Bicon, United States.

**Manufacturers: Device manufacturer:** Bicon, United States; Wayne, United States.

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