

Determining rectal dose through cervical cancer radiotherapy by 6 MV photon beam using TLD and XR type T GAFCHROMIC® Film

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Abstract

Background: The goals of the present research were to investigate the rectal dose during four chosen techniques of cervical cancer radiotherapy and to examine how accurately the treatment planning represents dose measurements, and its practicality for routine use as well as, to determine the homogeneity of dose in tumor volume. **Materials and Methods:** The study was carried out using a Nepton 10-PC unit and a Rando phantom. The equipments which were used for dose determination were a Radiochromic densitometer with GAFCHROMIC® film (XR type T), and a thermo-luminescent dosimeter (TLD) reader system with TLD chips for rectal and target volume dose determination. Several techniques of external beam radiation therapy such as two-field (AP-PA), three-field and four-field with equal tumor dose and with equal applied dose were planned. **Results:** The maximum dose received by rectum was caused by two-field technique. The results of two dosimetry types were compared with each other as well as with the treatment planning, however, no statistically significant difference was observed between them ($p > 0.05$). In three-field, four-field with equal tumor dose and four-field with equal applied dose, rectal dose was lower, respectively 26.17%, 33.70% and 16.47%, than tumor dose. **Conclusion:** This study showed that dosimetry using TLD and film during radiotherapy could have a useful role as a predictor of choosing appropriate technique for preventing future rectal complications. Dose limitation to the rectum could possibly be achieved by using three-field and four-field techniques with equal tumor dose while maintaining a high dose to the tumor.

Reaxys Database Information

Author keywords

Cervix cancer; Rectal dose; TLD; XR type T film

Indexed Keywords

EMTREE medical terms: article; cancer radiotherapy; device; dosimetry; equipment; film; intermethod comparison; phantom; photon therapy; radiochromic densitometer; radiodensitometry; rectum; thermoluminescence dosimeter; treatment planning; uterine cervix cancer

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