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Investigation of integral dose in pelvic region using different planning treatment techniques

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Although radiotherapy is an important part of cancer treatment, it can cause cancer development. In the past 10 years, it has been shown that radiotherapy has a small but statistically significant contribution to the development of secondary cancers.

The increase in the integral dose, which is defined as the dose taken by the tissues other than the target tissue, increases the risk of secondary cancer related to radiotherapy in long-term patients. Although the formation of secondary radiation outside the treatment area during radiotherapy is known, the differences due to the new treatment techniques have not been evaluated as dosimetric and still remain hypothetical.

In this study, we aimed to measure and compare the integral dose in vivo in radiotherapy with treatment techniques (3D Conformal Radiotherapy, Intensity Modulated Radiotherapy, Intensity Modulated Arc Therapy).Thermally stimulated luminescence materials have been an important tool in measuring the ionizing radiation dose. Due to some advantages of the thermoluminescence dosimeters in the field of personal, clinical, environmental and space applications, many studies have been carried out to produce more efficient TL dosimeters in recent years. In order to do this, in-vivo dosimetry systems, TLD-100H dosimeters as a Thermoluminescent Dosimeter (TLD) was used to compare the treatment schedule with the TPS dose. Pelvic region, where high energy is used more and high dose applications are made more, is selected as the target treatment area. After special treatment planning for different treatment techniques, the volume determined in rando phantom was irradiated. In vivo dosimetry was placed in 10 localizations outside the treatment area. Doses to which the organs in the out of area areas were exposed were determined. The planned dose values of TLD dosimeters and treatment planning system (TPS) dose values were compared.

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