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LETTER TO THE EDITOR

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Comment on "Incidence risk assessment of secondary cancer due to radiotherapy of women with rectal cancer using BEIR VII, EPA, and ICRP models"

Hamid Ghaznavi

Department of Radiology, Faculty of Paramedical Sciences, Kurdistan University of Medical Sciences, Sanandaj, Iran

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Dear Editor, I have read with much interest the paper of Hamzah et al. who recently published a paper entitled "Incidence risk assessment of secondary cancer due to radiotherapy of women with rectal cancer using BEIR VII, EPA, and ICRP models" [1]. The aim of this study was to evaluate secondary cancer for organs at risk for women with rectal cancer treated using the three-dimensional conformal radiation therapy (3DCRT) technique. The novelty of this paper was the use of three radiobiological models to estimate secondary cancer risk. It was very interesting and motivating me to read it carefully and share it with my colleagues. The authors used Biological Effects of Ionizing Radiation (BEIRVII), Environmental Protection Agency (EPA) and International Commission on Radiological Protection (ICRP) models for measuring of excess relative risk (ERR) and excess absolute risk (EAR). These models were basically designed for organs that received low radiation dose (below 1 Gy) [2, 3]. In this paper the mean dose of organs at risk, such as small bowel, bladder, femur head, ovaries, uterus, kidney, skin, and bone, were 18.12, 44.44, 22.99, 44.56, 45.37, 2.20, 16.65, and 22.20 Gy, respectively.

BEIR VII model is not appropriate for high dose; hence, cancer risk estimation encounters an error. On the other hand, received dose for organs in field is inhomogeneously distributed. To change inhomogeneously distributed dose to a homogeneous dose, the concept of organ equivalent dose (OED) has been applied. The OED was calculated using the Schneider paper, this model considered repair cells after radiotherapy, dose fractionation, dose–response curve, etc [4]. Therefore, for more accurate estimation of secondary cancer risk for organs in field that receive high dose, it is better to use the OED model instead of other models[5, 6]. Models mentioned in Hamzah et al. investigation are appropriate for estimating cancer risks from low dose radiation exposure for medical imaging modalities, such as radiography and computed tomography, where organs in radiation box received low dose[7, 8]. However, we can perform models such as BEIR VII and EPA for secondary cancer risk estimation in radiotherapy where organs in or out of the filed received low dose [9–12].

The shortcoming of this paper comes from using models such as EPA and BEIR VII instead of the OED model for calculation secondary cancer

Address for correspondence: Hamid Ghaznavi, Department of Radiology, Faculty of Paramedical Sciences, Kurdistan University of Medical Sciences, Sanandaj, Iran; e-mail: hamid.ghaznavi@muk.ac.ir, ghaznavi2691@gmail.com

risk for organs in the radiation field which received inhomogeneous high dose (> 10 Gy).

It should be noted that the issue of using an appropriate model in order to accurately estimate cancer risk have been evaluated in radiotherapy [13, 14], which reflects the importance of selecting the best risk model for radiotherapy. We would like to make it clear that my comment is not intended to challenge the effort and dedication put into conducting the investigation, but rather to provide additional insights and perspectives on the topic We hope that my comments help better understand the usage of an appropriate model for the evaluation of secondary cancer risk in radiotherapy. So, we suggest that authors can utilize the OED model to calculate secondary cancer risk for organs at risk in the radiation field such as bladder, femur head, uterus, kidney, skin, and bones. However, it should be noted that the OED model is not appropriate for estimating ovarian cancer risk. More research is required to find out whether the OED model can be used for this purpose. It is crucial to consider the radiation therapy techniques used when selecting a model to estimate secondary cancer risk.

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