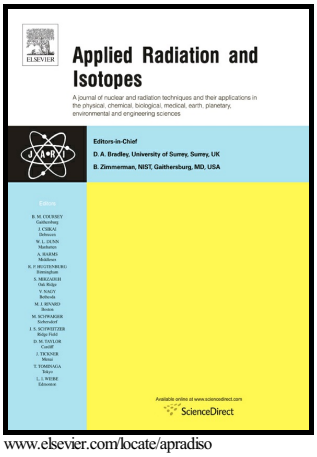

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Estimation of photoneutron dosimetric characteristics in tissues/organs using an improved simple model of linac head

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Abstract:

Neutrons as a one of the by-products of high-energy photons in radiotherapy increase the patient's risks and could cause secondary cancers. Therefore, a new corrected simplified model for linac head was introduced to calculate equivalent (H) and absorbed (D) doses in different tissues/organs of a phantom model. The photoneutron spectrum calculated with this model was in agreement with the spectrum obtained by using a detailed linac´s head model having all components. Besides, an anthropomorphic phantom was irradiated under different gantry angles of the corrected simplified model aiming to emulate 15, 18, 20, and 25 MV Siemens linacs. The results indicated that tissues which were within the treatment field received more dose than others. Furthermore, tissues which were in the vicinity of each other and the same depth in the phantom nearly received the same doses. Finally, fatal secondary cancer risk was also studied.

Keywords:

Linac, New corrected model, Photoneutron, Energy spectrum, Dose,MCNPX

Introduction

The amount of cancer cases grows every year becoming a health issue worldwide. Radiotherapy with high energy photons (above 10 MV) is the best way to cure cancers

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