

Testicular Dose and Associated Risk from Common Pelvis Radiation Therapy in Iran

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Abstract : This study aimed to investigate testicular dose (TD) and the associated risk of heritable disease from common pelvis radiotherapy of male patients in Iran. In this work, the relation between TD and changes in beam energy, pelvis size, source to skin distance (SSD) and beam directions (anterior or posterior) were also evaluated. The values of TDs were measured on 67 randomly selected male patients during common pelvis radiotherapy using 1.17 and 1.33 MeV, Theratron Cobalt-60 unit at SSD of 80 cm and 9 MV, Neptun 10 PC and 18 MV, GE Saturne 20 at SSD of 100 cm at Seyed-Al Shohada Hospital, Isfahan, Iran. Results showed that the maximum TD was up to 12% of the tumor dose. Considering the risk factor for radiation-induced heritable disorders of 0.1% per Sv, an excess risk of hereditary disorders of 72 per 10000 births was conservatively calculated. There was a significant difference in the measured TD using different treatment machines and energies ($P < 0.001$). The TD at 100 cm SSD were much less than that for 80 cm SSD ($P < 0.001$). The Pearson Correlation test showed that, as expected, there was a strong correlation between TD and patient's pelvis size ($r = 0.275$, $P < 0.001$). Using the student's t-tests, it was found that, there was not a significant difference between TD and beam direction ($P = 0.231$). Iranian male patients undergoing pelvic radiotherapy have the potential of receiving a TD of more than 1 Gy which might result in temporary azoospermia. The risk for induction of hereditary disorders in future generations should be considered as low but not negligible in comparison with the correspondent nominal risk.

Keywords : pelvis radiotherapy, testicular dose, infertility, hereditary effects

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