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Experimental and Analytical Dose Assessment of Patient's Family Members Treated with I-131

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Abstract : Radiation exposure to the patient's family members is one of the major concerns during thyroid cancer radionuclide therapy. The aim of this study was to measure the total effective dose of the family members by means of thermoluminescence personal dosimeter, and compare with those calculated by analytical methods. Eighty-five adult family members of fifty-one patients volunteered to participate in this research study. Considering the minimum and maximum range of dose rate from 15 µsv/h to 120 µsv/h at patients' release time, the calculated mean and median dose values of family members were 0.45 mSv and 0.28 mSv, respectively. Moreover, almost all family members’ doses were measured to be less than the dose constraint of 5 mSv recommended by Basic Safety Standards. Considering the influence parameters such as patient dose rate and administrated activity, the total effective doses of family members were calculated by TEDE and NRC formulas and compared with those of experimental results. The results indicated that, it is fruitful to use the quantitative calculations for releasing patients treated with I-131 and correct estimation of patients' family doses.

Keywords : effective dose, thermoluminescence, I-131, thyroid cancer
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