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### **Assessment the activity incorporated by the patient's caregivers after Iodine-131 thyroid therapy**

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#### **Abstract:**

**Aim/Introduction:** Evaluate the activity incorporated by the caregivers of the patients undergoing thyroid cancer (TC) therapy with iodine-131 (<sup>131</sup>I), based on the amount of <sup>131</sup>I excreted in the urine. **Materials and Methods:** An observational study was performed using a sampling of 22 patients and 34 caregivers. The patients, submitted to <sup>131</sup>I treatments for TC, were discharged from hospital 48h after therapy. All caregivers received instructions on radiation protection, based on Euratom recommendations. A urine sample was collected from every caregiver, about 70h after dischargement of the patients. The samples of urine were analyzed by gamma spectrometry. A biokinetic model was used for the <sup>131</sup>I according to the ICRP Publication 78 to quantify the activity incorporated by the caregivers, based on the concentrations of <sup>131</sup>I present in the urine. All ethical principles of the investigation were respected. **Results:** The average activity of <sup>131</sup>I given to the patients was 3207.3±1184.8 MBq. When the patients were discharged, the average effective dose rate measured at 1 meter distance was 8.2±6.1 µSv.hr<sup>-1</sup> (1-25 µSv.hr<sup>-1</sup>). In the 34 caregivers with average of 48.1±18.6 years only in 3 caregivers wasn't detected <sup>131</sup>I in the urine. The mean activity concentration of <sup>131</sup>I founded in the urine samples has 97.4 Bq.L<sup>-1</sup>(range: 0.0-1146 Bq.L<sup>-1</sup>) and the mean H<sub>T</sub>(thyroid) was 0.81±2.38 mSv, with a median of 0.03 mSv, a minimum of 0 mSv and a maximum of 9.46 mSv. The specific activity of <sup>131</sup>I in urine: it is not the same among on the classes of the administered activity (p=0.019); it is not the same on the different classes of caregivers ages (p=0.470); it is not the same on the different degree of relationship (p=0.744). We observed a moderate correlation between the specific activity of <sup>131</sup>I in the urine and the activity administered to the patients (ρ<sub>SP</sub>=0.540; p=0.001); and a high correlation between the specific activity of <sup>131</sup>I in the urine and the effective dose rate in the patients (ρ<sub>SP</sub>=0.730; p<0.001). CI of 95%. **Conclusion:** The patients are a radioactive source that can increase the exposure of the caregivers to ionizing radiation. The specific activity of <sup>131</sup>I in the urines of the caregivers is related to the activity administered to the patients. It is clear that caregivers of patients submitted to radioiodine therapy can be subject to internal contamination. The <sup>131</sup>I concentration in the urine due to internal contamination do not represent a radiological hazard for the exposed individuals. **References:** none

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Author Disclosure Information:

**M.J. Carapinha:** None.

**Topic (Complete):** Clinical dosimetry

**Disclosures (Complete):**

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