

## <sup>131</sup>I Effective Half-Life in Well Differentiated Thyroid Cancer Patients

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### Abstract

**Background:** Oral administration of radioiodine (<sup>131</sup>I) has been used in treatment of well differentiated thyroid cancer (DTC) after surgery to decrease recurrence and mortality. Patients with high dose <sup>131</sup>I administration (>2.96 GBq) requires hospitalization with isolation ward for radiation precaution to limit the radiation dose to family members and member of the public. The advised precautions are generally based on radiation dose rate and effective half-life for clearance of radioactive body burden.

**Objective:** To assess the effective half-life of <sup>131</sup>I in DTC patients who had been administered high-dose <sup>131</sup>I (>2.96 GBq).

**Material and method:** From January 2009 to February 2012, a retrospective review of total 200 DTC patients with age range 8-80 years, mean age 41.98±15.57 years, 173 women and 27 men treated postoperatively with high dose <sup>131</sup>I administration were collected for this study. The range of <sup>131</sup>I administered activity was 3.18-8.51 GBq with the mean activity was 4.82±1.0GBq. Two measurements of exposure at t time (1-3 days later,  $E_t$ ) were used for calculation of effective half-life of clearance of administered activity.

**Result:** The range of <sup>131</sup>I administered activity was 3.18-8.51 GBq with the mean activity was 4.82±1.0GBq. The mean initial exposure rates of total patients 81.65±32.36 ( $E_0$ ) and 17.55±15.94 ( $E_t$ )  $\mu$ Sv/h were shown with the mean duration time between  $E_0$  and  $E_t$  61.68±24.48 h. The mean effective half-life of <sup>131</sup>I clearance was 13.2±12.96 h and the median effective half-life was 9.60 h.

**Conclusion:** In DTC patients receiving <sup>131</sup>I administration after surgery, the value of effective half-life is in accordance with the previous reports in literature. Patient release planning should be differentiated on the basis of individual measurements of exposure rate and calculation of effective half-life.