

Summary

A Study on the Isolation Period of Patients with Metastatic Thyroid Cancer Treated by ^{131}I According to a New Guideline

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In Japan, a new guideline for the release of patients administered ^{131}I was issued by the Ministry of Welfare on June, 1998: The dose rate is under $30 \mu\text{Sv/h}$ at 1 m or the activity in the body is under 500 MBq. This study was designed to set the appropriate isolation period enough to satisfy these limits. A total of 28 patients with the history of total thyroidectomy and metastasis were selected for this study. In these patients, 28 patients were treated with oral administration of 3.7 GBq of Na^{131}I (72 times), and one of 28 patients was once treated with 5.55 GBq of Na^{131}I . Two of them were also received a total of 4 courses of a split dose therapy of 3.7 GBq of Na^{131}I (740 MBq once a week for 5 consecutive weeks = one course). Measurements of the external exposure dose ($\mu\text{Sv/h}$) at 1 m and the urinary excretory radioactivity (MBq) were performed at various times. There was a good correlation of the external exposure dose between standing ($x \mu\text{Sv/h}$) and sitting ($y \mu\text{Sv/h}$) postures ($y =$

$0.99x + 0.406$, $r = 0.99$, $p < 0.0001$, $n = 169$). The difference in the external exposure dose before and after urination ($x \mu\text{Sv/h}$) had a significant correlation with the urinary excretory radioactivity ($y \text{ MBq}$); $y = 16.6x + 24.8$, $r = 0.96$, $p < 0.001$, $n = 41$. Also, there was a significant correlation between the predicted value of residual radioactivity in the body ($y' \text{ MBq}$) and the external exposure dose ($x' \mu\text{Sv/h}$); $y' = 20.8x' + 31.5$, $r = 0.98$, $p < 0.001$, $n = 77$. In the patients treated with 3.7 GBq of Na^{131}I , the mean and S.D. values of the external exposure dose ($\mu\text{Sv/h}$) changed as follow: After 6 hr, 168 ± 40 ; 24 hr, 52 ± 23 ; 48 hr, 20 ± 15 ; 72 hr, 10 ± 9 ; and 96 hr, 8 ± 9 . The percentages of the patients satisfied the new guideline were as follow; 21.7% at 24 hr, 81.2% at 48 hr and 100% after 72 hr. Therefore the 3-day isolation is sufficient for the patients administered 3.7 GBq of Na^{131}I .

Key words: Iodine-131, Thyroid cancer, Radionuclide therapy, Radiation safety, Dosimetry.