

Differentiated thyroid cancer: comparison of therapeutic iodine ^{131}I biological elimination after discontinuation of levothyroxine versus administration of recombinant human thyrotropin

Dimitris PAPANIMITRIOU,*¹ Sofia KOTTOU,*² Loukia OROS,*¹ Ioannis ILIAS,*³ Michael MOLFETAS,*⁴
Virginia TSAPAKI,*⁵ Antonis PERRIS*⁶ and Ioulia CHRISTAKOPOULOU*⁷

*¹Department of Nuclear Medicine, White Cross General Hospital, Piraeus, Greece

*²Department of Medical Physics, Medical School, University of Athens, Athens, Greece

*³Department of Pharmacology, Medical School, University of Patras, Rion-Patras, Greece

*⁴Department of Medical Physics, Evagelismos Hospital, Athens, Greece

*⁵Department of Medical Physics, Konstantopoulou-Agia Olga Hospital, Athens, Greece

*⁶Department of Radiology, Aretaieion Hospital, University of Athens, Athens, Greece

*⁷Department of Nuclear Medicine, Sotiria General Hospital, Athens, Greece

The biological elimination of therapeutic ^{131}I in patients with differentiated thyroid cancer (DTC), post total or near-total thyroidectomy, was compared after withholding levothyroxine suppression against administration of recombinant human thyrotropin without stopping levothyroxine. In 163 patients (group G₁) levothyroxine was withheld before ^{131}I therapy: in 138 patients the tumor was limited to the thyroid bed (group G_{1.1}) and in 25 patients metastases were present (group G_{1.2}). A second group of patients (G₂; n = 28) received ^{131}I therapy after administration of recombinant human thyrotropin without stopping levothyroxine. Mean retained ^{131}I activity (as a percentage of the administered dose) was 5%–29% (group G_{1.1}), 20%–43% (group G_{1.2}) and 1%–17% (group G₂). The effective half-life of ^{131}I was 0.59–0.69 days (group G_{1.1}), 0.87–1.22 days (group G_{1.2}) and 0.38–0.44 days (group G₂). In conclusion, the use of recombinant human thyrotropin to prepare patients with thyroid cancer for therapy with ^{131}I shortens its effective half-life and reduces its retained activity compared to preparation with discontinuation of levothyroxine suppression.

Key words: ^{131}I , thyroid cancer, retained activity, effective half-life