

4. Manning JT, Spiut HJ, Tschen JA. Bronchioloalveolar carcinoma: the significance of two histopathologic types. *Cancer* 1984, 54, 525–534.
5. Clayton F. The spectrum and significance of bronchioloalveolar carcinomas. *Pathol Ann* 1988, 361–394.
6. Edwards CW. Alveolar carcinoma: a review. *Thorax* 1984, 39, 166–174.
7. Ohori NP, Yousem SA, Griffin J, *et al.* Comparison of extracellular matrix antigens in subtypes of bronchioloalveolar carcinoma and conventional pulmonary adenocarcinoma. An immunohistochemical study. *Am J Surg Pathol* 1992, 16, 675–686.
8. Pääkkö P, Risteli J, Risteli L, Autio-Harmainen H. Immunohistochemical evidence that lung carcinomas grow on alveolar basement membranes. *Am J Surg Pathol* 1990, 14, 464–473.
9. Abrams J, Hüttenbrink KB. Die Implantationsmetastase eines Adenokarzinoms der Nebenhöhlen im Mittelohr. *Laryngo Rhino Otol* 1992, 71, 86–90.
10. Willis RA. Secondary tumours in sundry unusual situations. In *The Spread of Tumors in the Human Body*, 3rd. ed. London, Butterworths, 1973.

Table 1. Thyroglobulin levels versus scintigraphic findings after treatment with iodine-131 ( $^{131}\text{I}$ )

Tg level (ng/ml)	Number of patients with $^{131}\text{I}$ uptake		
	Thyroid remnants only	Lymph nodes	Distant metastases
< 1 ng/ml (n = 34)	28	6	0
1–< 5 ng/ml (n = 36)	34	2	0
> 5–< 15 ng/ml (n = 17)	13	2	2
> 15 ng/ml (n = 26)	14	5	7

*European Journal of Cancer* Vol. 32A, No. 7, p. 1262, 1996.  
Copyright © 1996 Elsevier Science Ltd. All rights reserved.  
Printed in Great Britain  
0959-8049/96 \$15.00 + 0.00

PII: S0959-8049(96)00020-2

## Thyroglobulin Measurement and Postablative Iodine-131 Total Body Scan After Total Thyroidectomy for Differentiated Thyroid Carcinoma in Patients with No Evidence of Disease

F. Tenenbaum, C. Corone, M. Schlumberger and C. Parmentier

Service de Médecine Nucléaire, Institut Gustave Roussy, 94805 Villejuif Cedex, France

DURING THE follow-up of patients with differentiated thyroid carcinoma, measurement of serum thyroglobulin (Tg) can lead to the early discovery of neoplastic foci [1,2] and an iodine-131 total body scan ( $^{131}\text{I}$ -TBS) post therapy is the most sensitive tool for their imaging [3]. This study was undertaken in patients with no evidence of disease after total thyroidectomy to evaluate the accuracy of the  $^{131}\text{I}$ -TBS performed after an ablative dose of radioiodine and of Tg measurement after thyroxine withdrawal.

Over the last 3 years, 135 patients with no evidence of disease were given an ablative dose of 3.7 GBq (100 mCi)  $^{131}\text{I}$ , 1–3 months after total thyroidectomy. Treatment with thyroxine was withdrawn for 5 weeks and T3 treatment for 2 weeks before the dose. On the day of  $^{131}\text{I}$  administration, serum TSH (Behring kit) was above 20 mU/ml in all patients; serum Tg was measured using an IRMA method (Dynotest Tg, Henning, Berlin); 22 patients with Tg auto-antibodies were excluded, and the recovery test was above 80% in all of

the remaining 113 patients. Four days after treatment with  $^{131}\text{I}$ , a TBS was performed with a nuclear rectilinear scan (Ohio Nuclear, Mentor, Ohio, U.S.A.) and a neck scintigraph was taken with a rectilinear scan.

$^{131}\text{I}$  uptake in the remnants of the thyroid was below 2% in all patients, thus confirming that a total thyroidectomy had been performed.

$^{131}\text{I}$ -TBS disclosed ectopic uptake in 11% of the patients with a Tg level below 5 ng/ml and in 37% of those with a Tg level above 5 ng/ml (Table 1). Of the 12 patients with a Tg level below 15 ng/ml and who had ectopic uptake, all were cured after further treatments, with surgery in the 10 patients with lymph node metastases and with radioiodine treatments in the 2 patients with lung metastases. At subsequent TBS, no radioiodine uptake was found and the Tg level after thyroxine withdrawal was undetectable.

Of the 26 patients with a Tg level above 15 ng/ml, 12 patients had ectopic iodine uptake and were treated with surgery, radioiodine or external radiotherapy. The remaining 14 patients had only thyroid remnants: 6 months later, serum Tg was still elevated after thyroxine withdrawal in 11 of the 14 patients, suggesting the presence of non-functional neoplastic foci.

In conclusion, this study advocates the combined use of both tools in patients with unfavourable prognostic indicators, even in those with a low Tg level after thyroxine withdrawal. The Tg level appears to be of major value both for the diagnosis of neoplastic foci after apparently complete initial surgery and for prognosis.

1. Schlumberger M, Fragu P, Gardet P, Lumbroso J, Violot D, Parmentier C. A new immunoradiometric assay (IRMA) system for thyroglobulin measurement in the follow-up of thyroid cancer patients. *Eur J Nucl Med* 1991, 18, 153–157.
2. Schlumberger M, Arcangeli O, Piekarski JD, Tubiana M, Parmentier C. Detection and treatment of lung metastases of differentiated thyroid carcinoma in patients with normal chest X-rays. *J Nucl Med* 1988, 29, 1790–1794.
3. Pacini F, Lippi F, Formica N, *et al.* Therapeutic doses of iodine-131 reveal undiagnosed metastases in thyroid cancer patients with detectable serum thyroglobulin levels. *J Nucl Med* 1987, 28, 1888–1891.

Correspondence to F. Tenenbaum at Service de Médecine Nucléaire, Hôpital Cochin, 27 rue du faubourg Saint-Jacques, 75014, Paris, France.

Received 22 Dec. 1995; accepted 8 Jan. 1996.