

Tomoscintigraphy and Radiolabelled Monoclonal Antibodies for the Detection of Thyroid Cancers

Maurice R. TUBIANA, M. D.

Institute Gustave-Roussy, France

Single photons computerized tomography or transaxial tomoscintigraphy (TS) can achieve the reconstruction of the distribution of a radiolabelled tracer in a transverse section or any other plane sections (frontal, sagittal or oblique). In TS the contrast is related to the ratio between the activity per unit mass of the tumor and the normal tissues. For the study of the uptake of a tracer in a small tumor, TS represents an improvement over conventional scintigraphy which is volume dependent.

During the course of thyroid cancers three tumor tracers are particularly useful: thyrocalcitonin and CEA in medullary cancers, and thyroglobulin (Tg) in the differentiated cancers. An elevated level of any of these tracers in the serum demonstrates the existence of residual neoplastic tissues, but these are often difficult to localize by conventional techniques.

We have attempted to use radiolabelled monoclonal antibodies against CEA and Tg for this purpose. In five patients with medullary thyroid cancers, anti-CEA antibodies labelled with ^{131}I proved to be able to localize even relatively small tumors. TS was clearly superior to rectilinear scintigraphy for the detection of small tumors. For the study of recurrence within the thyroid gland it was useful to perform complementary TS with ^{123}I in order to eliminate possible free ^{131}I uptake by thyroid tissues. The difference in the respective distribution of ^{131}I and ^{123}I enabled one to delineate normal thyroid tissue and medullary cancer.

Anatomical landmarks obtained with CT scan and TS of the bones following $^{99\text{m}}\text{Tc}$ methylen Di-Phosphonate proved to be useful for the precise localization of tumors visualized by labelled antibodies.

Anti-Tg antibodies were able to detect with great effectiveness experimental thyroid tumors in the rat. Preliminary results of the on-going clinical investigations in patients with differentiated thyroid cancers will be reported and discussed.